

Effect of Salinity Stress on Germination Properties in Tomato (*Lycopersicon esculentum* L. var Chef fallat).

A. Salehi Sardoei¹, G.A. Mohammadi², S. Hosseini Gheshlagh³

¹Young Researchers Club, Jiroft Islamic Azad University, Jiroft Branch, Iran.
(phone: 098-09139570747; e-mail: alisalehisardoei1987@gmail.com).

²Young Researchers Club, Jiroft Islamic Azad University, Jiroft Branch, Iran.
(phone: 098-09137621917; e-mail: Gholamabasm@yahoo.com).

³Young Researchers Club, Jiroft Islamic Azad University, Jiroft Branch, Iran.
(phone: 098-09309186778; e-mail: shaghayegh.Hosseini2014@gmail.com).

Abstract— The response of tomato genotype Chef fallat against five salinity levels (distilled water as control, 25, 50, 75 and 100 mM) were studied at germination and early seedling stages. An experiment with conducted by using a completely randomized design (CRD) with three replications. Shoot and root length, shoot and root fresh weight, seed vigor, mean germination time, germination percentage and rate measured 14 days after germination. Results of data analysis showed that, there were significant differences between salinity stress levels for all investigated traits except mean germination time. Results of data analysis showed that, indicate that the maximum germination percentage during the test was related to the observer 25 mM and control (Distilled water) treatment. the maximum germination percentage at day 14, with an average of 98.76 and 97.66%, were related to the Distilled water and 25 mM treatments. The maximum root length, at day 14 of the test, was from the 25 mM treatment, which did not show a significant statistical difference with the control (Distilled water) treatment. In the entire measured traits, we achieved better results from the control (Distilled water) treatment and 25 mM treatments, in comparison to the 50 mM density, which indicates that the Chef fallat tomato genotype could grow properly in low-saline conditions, but this growth faces an extremely significant decrease with the increased salt densities.

Key words: Germination, Seed Vigor, Salinity Stress, Tomato.

Introduction

During their growth crop plants usually exposed to different environmental stresses which limits their growth and productivity. Among these, salinity is the most severe ones [17].

Salinity becomes a concern when an “excessive” amount or concentration of soluble salts occurs in the soil, either naturally or as a result of mismanaged irrigation water. The major inhibitory effect of salinity on plant growth and development has been attributed to osmotic inhibition of water availability as well as the toxic effect of salt ions responsible for Stalinization. Nutritional imbalance caused by such ions leads to reduction in photosynthetic efficiency and other physiological disorders [13].

In arid and semi arid regions, limited water and hot dry climates frequently cause salinity problem that limit or prevent crop production. It has also been reported that under saline conditions, germination ability of seeds differ from one crop to another and even a significant variation is observed amongst the different varieties of the same crop [16].

Salt stress affects many physiological aspects of plant growth. Shoot growth was reduced by salinity due to inhibitory effect of salt on cell division and enlargement in growing point. Early flowering reduced dry matter, increased root: shoot ratio and leaf size caused by salinity may be considered as possible ways of decreasing yield in plant under salt stress condition [18].

Seed germination is usually the most critical stage in seedling establishment, determining successful crop and seed quality. It is necessary to identify the sensitivity and tolerance level of a production [5]. Crop establishment depend on an interaction between seedbed environment varieties at early seedling stages for successful crop production in a saline environment [13].

The present study was therefore, conducted with the objectives to determine the response of tomato genotype to salinity stress at germination and seedling stages under controlled conditions. Moreover, NaCl was used for salinity stress induction in tomato.

Materials and Methods

In order to study the effects of salinity stress on germination and early seedling growth in tomato genotype, an experiment was conducted using a completely randomized design [CRD] with three replications. In this experiment, genotype inclusive *Chef fallat* were evaluated in five levels of salinity treatment (distilled water as control, 25, 50, 75 and 100 mM) by using different NaCl concentrations. This experiment was carried out at horticulture Laboratory, Department of Agriculture, University of Jiroft Branch, Iran.

The seeds were sterilized by soaking in a 5% solution of hypochlorite sodium for 5 min. After the treatment, the seeds were washed several times with distilled water. 30 seeds were put in each Petridish [with 9 cm diameter] on filter paper moistened with respective treatment in 3 replications. The petridishes were covered to prevent the loss of moisture by evaporation. The petridishes were put into an incubator for 14 days at 25 centigrade degrees temperature and 65% relative humidity. Every 24 hours after soaking, germination percentage and other traits were recorded daily. After 14 days of incubation, shoot and root length, shoot and root fresh weight, seed vigor, mean germination time, germination percentage and rate was measured. Seeds were considered germinated when the emergent root reached 2 mm length. Rate of germination, germination percentage and mean germination time were calculated using the following formulas [Mostafavi, 2011] :

$$\text{Formula 1: } GP = SNG/SNO \times 100\%$$

Where: GC is germination percentage, SNG is the number of germinated seeds, and SNO is the number of experimental seeds with viability [1].

$$\text{Formula 2: } GR = \Sigma N / \Sigma (n \times g)$$

Where: GR: Germination rate; n: number of germinated seed on gth day and g: Number of total germinated

$$\text{Formula 3: } \text{Seed Vigor} = [\text{seedling length (cm)} \times \text{germination percentage}]$$

Analysis of variance was performed using standard techniques and differences between the means were compared through Duncan's multiple Significant Difference test [$P < 0.05$] using SAS release 9.1 [SAS, 2002] software package.

Results and Discussions

Results of the mean data comparison, indicate that the maximum germination percentage during the test was related to the observer treatment 25 mM and control (Distilled water). The maximum germination percentage at day 12, with an average of 98.76 and 97.66%, were related to the pure water and 25 mM treatments [table 1]. Maggio et al., [19] found out in their studies that by increasing the salinity, the percentage and speed of the germination decreases [19]. The maximum germination rate was seen in both the control (Distilled water) and 25 mM treatments, which also their germination speed decreased further into the test [table 2].

Table 1- Mean comparison of different salinity levels of studied trait Germination Percentage (GP)

Salinity Levels (mM)	Germination Percentage (day)				
	6	8	10	12	14
0	73.26a	97.66 a	97.66a	97.66a	97.66 a
25	53.38b	96.57 a	96.57a	98.76a	98.76 a
50	6.66c	38.82	43.29b	43.29b	43.29 b
75	0c	0c	0c	9.99c	9.99c
100	0c	0c	0c	0c	0c

Table 2- Mean comparison of different salinity levels of studied trait Germination rate (GR)

Salinity Levels (mM)	Germination rate (day)				
	6	8	10	12	14
0	3.66a	3.91a	2.93a	2.44a	2.09a
25	2.66b	4.04a	2.90a	1.66ab	2.11a
50	0.33c	0.83b	1.16b	1.16b	0.92b
75	0c	0b	0c	0c	0c
100	0c	0b	0c	0c	0c

According to Ayaz et al., (3), decrease of seed germination under salinity stress conditions is due to occur of some metabolically disorders. It seems that, decrease of germination

percentage and germination rate is related to reduction in water absorption into the seeds at imbibitions and seed turgescence stages [21].

Some studies referred that salinity stress can contribute to improve germination rate and seedling emergence in different plant species by increasing the expression of aquaporins (15), enhancement of ATPase activity, RNA and acid phosphatase synthesis [1], also by increase of amylases, proteases or lipases activity [2].

The maximum root length, at day 14 of the test, was from the 25 mM treatment, which did not show a significant statistical

difference with the control [Distilled water] treatment, also the highest root length in other days of the test was still owned by the 25 mM treatment, which reached its height in comparison to other treatments, at day 6, 8, 10, 12 and 14, 0.35, 10.12, 13.32, 14.61 and 15.56 cm [table 3]. [20] in a test they induced on 5 varieties of tomato, found out that by increasing the salinity, the shoot

Table 3-Mean comparison of different salinity levels of studied trait root length (RL) decrease.

Salinity Levels (mM)	Root length (cm)				
	6	8	10	12	14
0	0.34a	1.24b	1.36b	10.81a	1.66b
25	0.35a	10.12a	13.32a	14.61a	15.56a
50	0.20ab	1.83b	3.32b	4.03a	5.04b
75	0b	0b	0.19b	0.25a	0.32b
100	0b	0b	0b	0a	0b

The results from table [4] indicate that the maximum shoot length is achieved at days 12 and 14 of the test, from the 25 mM, mean with, 0.57 and 2.11 cm [table 4]. Maximum fresh weight

of root and shoot was from the 25 mM treatment [table 4]. reported that the wet weight of the fresh and root in the cowpea reduces, by increasing the salinity density [23].

Table 4-Mean comparison of different salinity levels of studied trait Shoot length and shoot (LS) and root Fresh weight (FW)

Salinity Levels (mM)	Shoot length (cm)		Fresh weight (g)	
	12	14	shoot	root
0	0.22a	2.09a	0.066ab	0.032b
25	0.57a	2.11a	0.15a	0.083a
50	0.17a	1.23a	0.02a	0.026b
75	0a	0a	0b	0b
100	0a	0a	0b	0b

Results indicated that by increasing the test time, the Mean Germination Time also increases, which its height could be seen at the control [Distilled water] and 25 mM treatment, its least from the 50 mM treatment, which indicated a significant

statistical difference with each other. The Mean Germination Time was at day 14, related to the control [Distilled water] and 25 mM treatments, which did not show a significant statistical difference with each other [table 5].

Table 5- Mean comparison of different salinity levels of studied trait Mean Germination Time (MGT)

Salinity Levels (mM)	Mean Germination Time				
	6	8	10	12	14
0	4.40a	7.46a	9.77a	11.73a	13.68a
25	3.20b	7.73a	9.66a	11.60a	13.84a
50	0.46c	1.86b	3.88b	5.20b	6.06b
75	0.06c	0.08c	0.99c	2.13c	3.10c
100	0c	0c	0c	0c	0c

It seems that, NaCl concentration [salinity Stress] affects on seed germination via limitation of water absorption by seeds [7], excessive use of nutrient pool [6] and creation of disorders in protein synthesis.

Its height was at days 8 and 10 of the test, in the 25 mM treatment. There was no significant difference between the

control [Distilled water] and 25 mM treatments. The results of the data mean comparisons indicated that the control (Distilled water) treatment had the least germination percentage 50%, its height was from the 75 mM treatment [table 6].

Table 6- Mean comparison of different salinity levels of studied trait seed vigor and Germination Percentage 50%

Salinity Levels (mM)	seed vigor		Germination Percentage 50%
	8	10	
0	127.34b	135.57b	4.12b
25	258.26a	355.22a	5.71b
50	58.59bc	81.64b	22.94a
75	14.69c	22.19b	39.50a
100	0c	0c	0b

NaCl causes osmotic stress and could be used as a salinity simulator [21]. In the present experiment NaCl was used to create the osmotic stress, as most of the researchers [14] utilized it for the development of water salinity environment in laboratory studies. The variation among genotype showed that germination percentage decreased with the increase in NaCl concentration in all the genotype *cal-ji*.

In the present study the findings are very similar to the former case, in which germination decreased due to the increase in NaCl concentration. Present study strongly supports that germination percentage and root to shoot ratio can be utilized to screen tomato genotype for salinity tolerance. There are many reports which are in agreement with the present findings indicating that

salinity stress severely reducing the seed germination and early seedling growth. But the varieties having genetic potential to maintain the higher growth under stress conditions are saline tolerant.

In this study, we analyzed the effect of NaCl salt, on the tomato's germination and bud growth indicators. In this study, the percentage and speed of the germination was analyzed as an index for the tomato seed's germination, and the plumule and radicle's wet weight and length as a criterion for the tomato bud's growth. As it was mentioned in the result section, the tomato's growth criterions follow a decreasing trend in various salt densities, which match the results achieved by other researchers. Furthermore, other researchers also reported a

negative impact from the salinity on the germination of various plants, such as canola, soy, beans, cowpea, pea and tomato. Many saline inhibitors have been also reported [9]-[8]-[10]-[11]. Foolad and Jones [12] also reported that the tomato varieties power for fast germination in the saline conditions, independent from the growth potency, is more in the growing stage, also a disaffiliation has been reported in other studies, between the saline resistance in one stage of growth. In this study, we analyzed the effect of NaCl salt, on the tomato seed's germination, stamina, and capability to achieve a 50% germination rate. In this research, the tomato seed's average germination and stamina are analyzed as a criterion for the tomato seed's germination. As mentioned in the results section, in various salt densities, the tomato seed's germination and stamina faced a decreasing trend, which matches the reports from other researchers. Furthermore, other researchers also reported a negative impact from the salinity on the germination of various plants, such as canola, soy, beans, cowpea, pea and tomato. The saline-resistant types could benefit from the dilution mechanisms and its accumulation in the vacuoles, and therefore partially protect themselves from their ill-effects [4].

Conclusions

In the entire measured traits, we achieved better results from the 25 mM and control [Distilled water] treatment, in comparison to the 50 mM density, which indicates that the Chef fallat tomato variety could grow properly in low-saline conditions, but this growth faces an extremely significant decrease with the increased salt densities.

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Performance Evaluation of Optimal Locating and Sizing of DGs as Hybrid Systems

Seyyed Amir Hashemi Zadeh^{1*}, Omid Zeidabadi Nejad²,

Hasan fatehi marj³, Ali Akbar GHaraveisi⁴

^{1*}Department of electrical engineering, islamic azad university branch Rafsanjan ,Iran, sa_hashemizadeh@yahoo.com

²Department of electrical engineering, islamic azad university branch najaf abad ,Iran, omid_univ5279@yahoo.com

³assistant professor of control engineering, Department of electrical engineering, vali-e-asr university of rafsanjan ,Iran, h.fatehi@vru.ac.ir

⁴assistant professor of control engineering, Department of electrical engineering, shahid bahonar university of kerman,Iran,, a_gharaveisi@yahoo.com

Abstract— Distributed resources can provide power (active and reactive) as hybrid system in transmission and distribution networks. These sources show desirable effects such as improved power quality, improved voltage deviation, reduced peak shaving and losses, increased reliability, etc in the transmission and distribution networks. To achieve the desired effects listed above, optimal location and size determination has a particular feature. Lack of proper placement of the hybrid distributed generation system in the network may increase the errors causing voltage fluctuations and may increase losses. Therefore, the technical evaluation as well as qualitative and quantitative analysis of a wide range of factors affecting network security and performance is essential in this case. This paper applies Binary Genetic Algorithm (BGA) for locating DG (Distributed Generations) to reduce losses and improve voltage deviation. Then, DG sizing as a hybrid system by PSO algorithm is done to reduce the net cost of the equipment. This approach is carried out on three IEEE networks distribution buses 9, 13 and 34 and, the best location and the optimal size is presented according to the objectives.

Keywords— Hybrid System, Distributed Generation DGs, Binary Genetic Algorithm (BGA), Particle Swarm Optimization (PSO).

I. INTRODUCTION

THE use of hybrid systems in distribution networks is growing, in the meantime, there are various technologies of distributed generation sources, in which the Photovoltaic systems have been considered by many, but one of the problems and issues associated with these systems as

distributed generation resources is output strong influenced by weather conditions, especially in the intensive solar radiation. Extreme weather conditions, particularly the output radiation of the sun. This variable output has adverse effects such as increased line losses, degraded voltage profiles etc on power network. Use of different sources in hybrid systems, compared to independent use of resources causes increased efficiency and more reliability of the system. Therefore, hybrid photovoltaic systems, wind turbines, solid oxide fuel cells and storage batteries can complement each other and create a system that is not affected by atmospheric conditions. Many definitions of distributed generation (DG) systems is presented. A comprehensive definition where there is no limit in terms of technology and capacity would be that energy source is directly connected to the distribution network or the consumer [1].consequently, different technologies as fuel cells, diesel generators, solar cells, wind turbines, etc. can be used. Energy supply may be fossil fuels, renewable sources and energy storage sources and capacity of is defined conventionally of a few kW to tens of MW. There has been a keen interest in the use of renewable resources such as solar energy in recent years due to pollution caused by fossil fuels and their depletion. This has led fast progress of technologies making use of photovoltaic energy [2]. Locating and determining of the capacity of DG units in the distribution network of a predetermined genetic algorithm with the aim of reducing the power loss is being done [3]. The use of photovoltaic cells has advantages such as high reliability, low maintenance costs, no pollution and no noise. Basically, a solar cell consists of a semiconductor p-n link type and when exposed to light generates a dc current [4]. Wind turbines and photovoltaic disadvantages and advantages over radial network regarding voltage profile and power distribution balance have been investigated [5]. the renewable resources technical problems and potential challenges in integrating them with intelligent network connection has been investigated [6]-[7].

^{1*}Seyyed Amir ,Hashemi Zadeh. MSc of power Electrical Engineering, Department of Electrical Engineering, Islamic azad university branch rafsanjan, rafsanjan,Iran (corresponding author to provide phone: 00989133936817; e-mail: sa_hashemizadeh@yahoo.com).

²Omid ,zeid abadi nejad. MSc of Power Electrical Engineering, Department of Electrical Engineering, Islamic azad university branch najaf abad. Iran (e-mail: omid_unive5279@yahoo.com).

³Hasan, Fatehi Marj. Assistant Professor of Electrical Engineering, Department of Electrical Engineering ,vali-e-asr university of rafsanjan ,Iran (e-mail: h.fatehi@vru.ac.ir).

⁴Ali Akbar, GHaraveisi. Assistant Professor of Electrical Engineering, Department of Electrical Engineering, shahid bahonar university,kerman ,Iran (e-mail: a_gharaveisi@yahoo.com).

II. ELEMNT MODELING OF HYBRID SYSTEM

Fig. 1 shows the structure of a hybrid system. In addition, a complex system consists of major component and a number of AC and DC machines. These components are wind turbines, Solar array (PV), Solid oxide fuel cell (SOFC), Battery storage system as a backup system, DC/AC converter, and MPPT controller system. The system elements model is illustrated as the following.

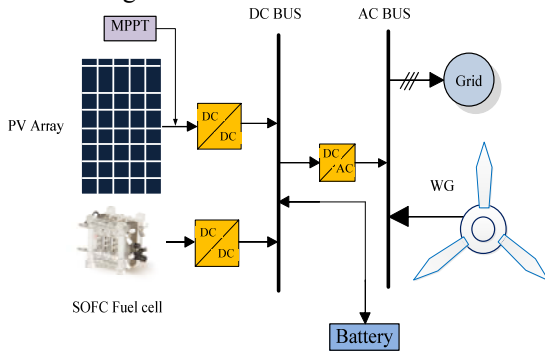


Fig.1 Block diagram of a hybrid system

MODELING AND DESIGN OF PHOTOVOLTAIC MODULES

Static equivalent circuit of a solar cell is displayed in Fig. 2 as a diode circuit. The relations between output voltage U and current loads I , can be found as equation (1):

$$I = I_L - I_D = I_L - I_o \left[\exp\left(\frac{U + RI_s}{\alpha}\right) - 1 \right] \quad (1)$$

Where I_L Optical flow, I_o Saturation current, I loads flow, U output voltage, R_s Series resistance, α Voltage Temperature Coefficient.

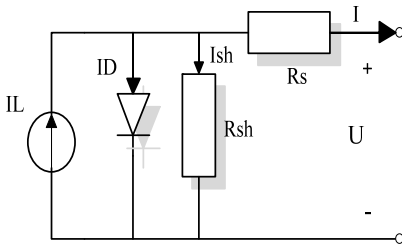


Fig.2 Static Equivalent circuit of a solar cell

Photovoltaic cell is a P-N bond formed of semiconductor materials as a diode. Energy carriers are created by the light hits the photovoltaic cells, which generate electrical current in case of short circuit of the terminals. Current is shown in the equation (2).

$$I_L = \frac{\phi}{\phi_{ref}} \left[I_{L,ref} + \mu_{I,sc} (T_c - T_{c,ref}) \right] \quad (2)$$

Where $\frac{w}{m^2}$ is Solar radiation in watts per square $\frac{w}{m^2}$, ϕ_{ref} reference radiation is generally considered $1000 \frac{w}{m^2}$, $I_{L,ref}$ reference optical flow at $(1000 \frac{w}{m^2}, 25^\circ C)$, T_c cell

temperature PV, $T_{c,ref}$ reference temperature (here assumed $25^\circ C$), $\mu_{I,sc}$ short circuit current temperature coefficient in terms of $\frac{A}{C}$. I_o Saturation current is given in equation (3):

$$I_o = I_{o,ref} \left(\frac{T_{c,ref} + 273}{T_c + 273} \right)^3 \exp \left[\frac{e_{gap} N_s}{q \alpha_{ref}} \left(1 - \frac{T_{c,ref} + 273}{T_c + 273} \right) \right] \quad (3)$$

Where $I_{o,ref}$ reference saturation current, e_{gap} material band gap (1.17 ev in silicon), N_s the number of PV series cells, q electron load $1.60217733 \times 10^{-19} C$, α_{ref} reference α ; Also, $I_{o,ref}$ current is obtained via the following equation (4).

$$I_{o,ref} = I_{L,ref} \exp \left(- \frac{U_{oc,ref}}{\alpha_{ref}} \right) \quad (4)$$

$U_{oc,ref}$: PV module open circuit voltage

α Temperature coefficient is given in the following equation(5):

$$\alpha_{ref} = \frac{2U_{mp,ref} - U_{oc,ref}}{\frac{I_{sc,ref}}{I_{SC,ref} - I_{mp,ref}} + \ln \left(1 - \frac{I_{mp,ref}}{I_{SC,ref}} \right)} \quad (5)$$

$U_{mp,ref}$: Maximum power point voltage at reference conditions, $I_{mp,ref}$ maximum power current voltage at reference conditions, $I_{SC,ref}$ short-circuit current at reference conditions [8]. Solar module features at $25^\circ C$ is given in the following table.

Table 1. Solar module features at $25^\circ C$	
Maximum power	225 Watt
Open circuit voltage	36.68 Volt
Short-circuit current	8.27 Amp
Operating point voltage	29.76 Volt
The number of cells in series	60

WIND TURBINE

Power generated by wind turbines is obtained from equation (6):

$$P_{wind} = \frac{1}{2} \rho . A . v^3 C_p(\lambda, \theta) \quad (6)$$

Where ρ is Density of air in terms of kg/m^3 , A is Area of air passing through the fins, V is wind speed in terms of m/s , C_p is power coefficient, θ is Pitch angle, λ is speed ratio shown in equation (7), [11].

$$\lambda = \frac{\omega R}{V} \quad (7)$$

Where ω rotor angular velocity and R radius of the rotor fins; It can be said that λ depends on function of the wind turbine to extract maximum productivity. Recoverable power ratio to the ultimate power C_p is as equation (8):

$$C_p = \frac{1}{2} \left[1 - \left(1 - \left(\frac{V_0}{V} \right)^2 \right) \right] \left(1 + \frac{V_0}{V} \right) = C_1 (C_2 - C_3 \theta - C_4) \exp(-C_5) \quad (8)$$

Table (2) shows wind turbine inductive generator parameters such as turbine data and generator data.

Table 2. wind turbine inductive generator parameters

Parameter	Amount
Base Wind speed	9 m/s
coefficients ($C_1 - C_5$)	[0.5176, 116, 0.4, 5, 21]
Nominal performance index	$[\beta=0, \lambda=8.1]$ for 0.48 pu
Rotor type	Squirrel cage rotor
Mechanical power	200 Horsepower
Nominal voltage	460 volt
Nominal frequency	50 Hz
Nominal speed of rotation	1785 Second round
Stator resistance	0.01282
Stator inductance	0.05050 (p.u)
Rotor resistance	0.00702 (p.u)
Rotor inductance	0.05051 (p.u)
Poles pairs	2

Fig. 3 shows changes in power coefficient C_p than λ in wind turbine.

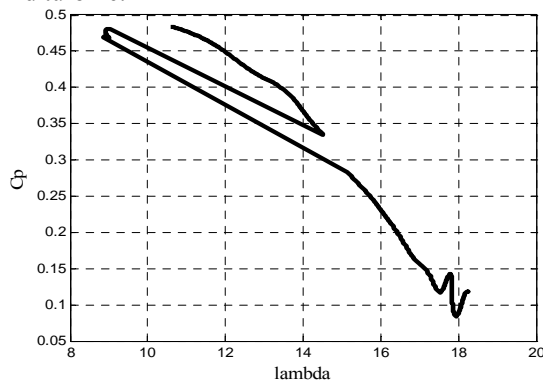


Fig.3 changes in power coefficient C_p than λ

SOLID OXIDE FUEL CELL

Solid oxide fuel cells with oxygen ion conductive ceramic electrolyte are considered as components of high-temperature fuel cells. The advantages of fuel cells include high efficiency, high reliability, and modular nature, ability to work with different fuels, low noise and high vibration performance. Fig. 4 shows the output voltage of SOFC. Fig. 5 shows a schematic of the solid oxide fuel cell [8].

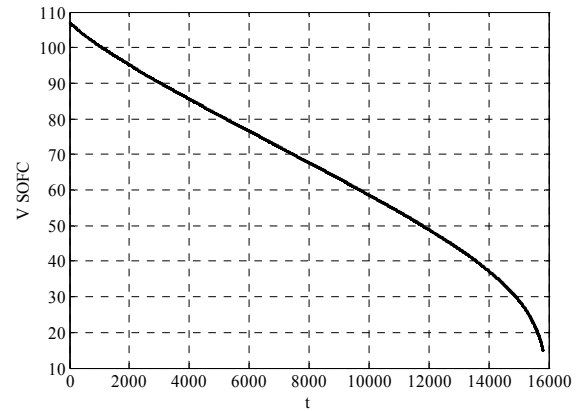


Fig.4 output voltage of SOFC

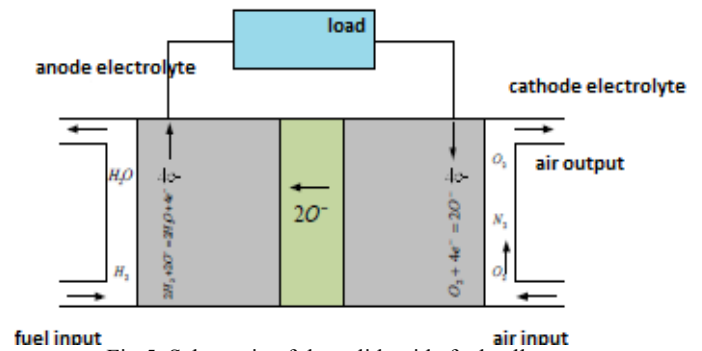


Fig.5. Schematic of the solid oxide fuel cell

3. PROPOSED METHOD

This paper uses Binary Genetic Algorithm (GA) to determine the optimal location and size of DG to reduce losses and improve voltage profile, and then Obtained value was hybridized by PSO algorithm with the aim of reducing fuel costs and the net cost of the equipment. Studied hybrid systems include photovoltaic systems and fuel cells, wind turbines and photovoltaic systems, photovoltaic systems and fuel cells and wind turbines. The second system consists of fuel cell and photovoltaic and electrolyzer, tank, batteries of wind turbine.

BINARY GENETIC ALGORITHMS

This algorithm is based on the evolution of living beings human race [9]. First, binary strings randomly created, each string is called a chromosome and a set of chromosomes form a population. Now, with a generation (initial population) begins the search for the optimum solution. Then, according to the fitness function, chromosomes with higher qualifications selected and optimized to create a better generation. The genetic algorithm has operators to improve algorithm that will be explained [10].

OPERATORS OF GENETIC ALGORITHMS

❖ Reproduction

At this stage, parental chromosomes are selected out of the chromosomes created in the previous generation according to their level of competence in accordance with their fitness function. Most popular method is the wheel method that is used in this paper, as well.

❖ Crossover

Children chromosome should be created after parent's selection. Crossover operator includes several methods to combine parental chromosomes and create offspring chromosomes. It is generally a value "between" 0.8 to 1. The genetic algorithm Flowchart is given in Fig. 6.

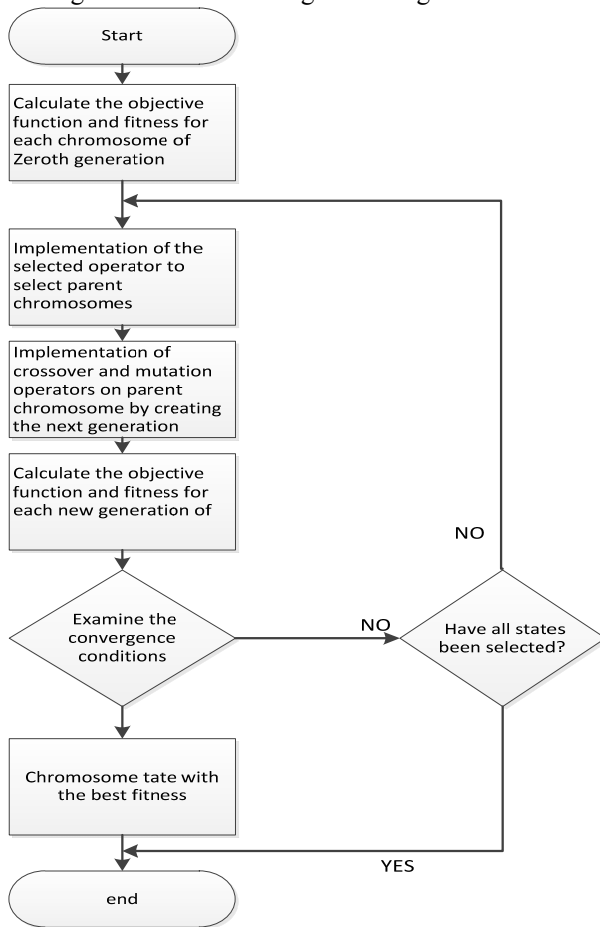


Fig.6 The genetic algorithm Flowchart

PARTICLE SWARM ALGORITHM

Particle swarm algorithm is a group in which a cluster of particles searches the possible space of the problem in order to find an optimal solution of the objective function. Each component moves in the search space with adjustable speed and holds the best position ever obtained in its memory. The best position achieved by all group members is dispatched among other members. In PSO method members do not change into new members, but behavior including their speed

and movement in search of the best answer is modified in the next iterations and diverted to the best answer. The first value is the best answer so far found by any of the members alone, this is known as *pbest*. It is assumed that search space has n number of dimensions, and then i th component can be defined by double n th of the next position (X_i) and (V_i) as equations (9) and (10):

$$X_i = [x_{i1}, x_{i2}, x_{i3}, \dots, x_{in}]^T \quad (9)$$

$$V_i = [v_{i1}, v_{i2}, v_{i3}, \dots, v_{in}]^T \quad (10)$$

Where $i=1, 2, 3, \dots, N$ and N equals to group members and T superscript is transpose operator. In the particle swarm algorithm, i th component saves the best position ever attained in its memory as $P_i = [P_{i1}, P_{i2}, \dots, P_{in}]^T$ vector that

$G = [g_1, g_2, \dots, g_n]^T$ vector means the best position ever attained by group. The i th component position in $t+1$ iteration is defined by equations (11) and (12):

$$v_i(t+1) = \omega(t) \times V_i(t) + C_1(t) \times r_1 \times (P_i(t) - X_i(t)) + C_2(t) \times r_2 \times (G(t) - X_i(t)) \quad (11)$$

$$X_i(t+1) = X_i(t) + \chi \times V_i(t+1) \quad (12)$$

In above equations, ω is inertia coefficient that represents the effect of the previous velocity vector on the current iteration. χ is contraction coefficient to limit the effect of the velocity vector into the above equation and is considered here equal to 0.7. C_1 and C_2 are cognitive parameters (or local acceleration) and social (or momentum across), respectively and r_1 and r_2 are two real numbers randomly selected according to a uniform distribution between zero and one. Whatever the result of the $C_2 \times r_2$ multiplication is greater, i th component moves more rapidly towards a position where their best ever obtained. The product affects particle velocity in the best position attained by the entire group. Larger Inertia coefficient encourages larger range of categories to search spaces; while smaller inertia factor increases class accuracy in local searches. Based on the experience gained, it is suggested that, at the search beginning a huge amount to be allocated to ω (here 1), to prioritize global search than local search, and in order to achieve the best possible answer its value gradually tends towards a small value such as zero [11]-[12]. Fig.7 shows PSO algorithm flowchart.

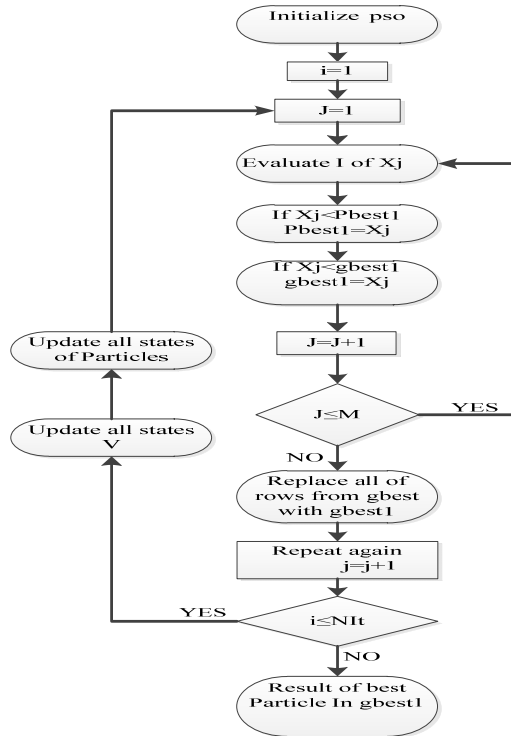


Fig.7 PSO algorithm flowchart

IV. STUDIED NETWORKS

In this paper three 9, 13 and 34 bus system is used. 9-bus network has the total active load of 12.368 MW and reactive load of 4.186 MVAR. The value of active and reactive losses in the absence of DG is 784.3 KW and 1036.6 KVAR, respectively. 13-bus network has the total active load of 10.536 MW and reactive load of 5.992 MVAR. The value of active and reactive losses in the absence of DG is 465.9 KW and 365.6 KVAR, respectively. 34-bus network has the total active load of 4.637 MW and reactive load of 2.873 MVAR. The value of active and reactive losses in the absence of DG is 221.7 KW and 65.1 KVAR, respectively.

V. OBJECTIVES AND CONSTRAINTS OF THE PROBLEM

Reduction of active power losses in a distribution system for the proper and effective functioning of the power system is necessary. Losses in a being exploited power system is as equation [13]:

$$P_L = \sum_{i=1}^N \sum_{j=1}^N A_{ij} (P_i P_j + Q_i Q_j) + B_{ij} (Q_i P_j - P_i Q_j) \quad (13)$$

The objective function is as equation (14):

$$\text{Fitness Function} = \text{Minimize } (w1 \cdot \frac{P_L}{P_{L, \text{Normal}}} +$$

$$w2 \cdot \sum_{i=1}^N \left(\frac{(1 - V_i)}{(1 - V_i)_{\text{Normal}}} \right)$$

Where the first Theorem in the objective function relates to system losses and is expressed by equation (15) as:

$$P_L = \sum_{k=1}^N \text{Loss}_k \quad (15)$$

The second Theorem in the objective function is voltage deviation. Experimentally obtained W1 and W2 coefficients used in balancing objective function in 9, 13 and 34 bus networks are 0.65 and 0.35, respectively. In equation (13), P_i and P_j are i th and j th active bus powers. Q_i and Q_j are i th and j th active bus powers. power limiting and voltage and current constraints are as (16, 17, 18) relationships:

$$\sum_{i=1}^N P_{DG_i} = \sum_{i=1}^N P_{D_i} + P \quad (16)$$

$$|V_i|_{\min} \leq |V_i| \leq |V_i|_{\max} \quad (17)$$

$$|I_{ij}| \leq |I_{ij}|_{\max} \quad (18)$$

V_i : i th bus voltage

I_{ij} : Flow between two i and j buses

Since the purpose of the optimization algorithm is to find hybrid system components optimized size. This system includes the net present value (NPV) of investment costs, maintenance, replacement of equipment and in case of the use of diesel generators, diesel generator fuel costs over the lifetime of the system that is 20 years. Net present value to equip net present value p it can be calculated according to equation (19):

$$NPC_i = N_i \times \left[\frac{CC_i + RC_i \times K_i (i_r, Li, yi) +}{O \& MC_i \times CRF(i_r, R)} \right] \quad (19)$$

In the above statement N is the number of units or (KG or KW) capacity, CC is Initial investment cost per (US\$/Unit), RC is the cost of each alternation (US\$/Unit) and $O \& MC$ is annual maintenance costs (US\$/Unit-yr), R is the project

lifetime (here is assumed to be 20 years), i_r is real interest, (here is assumed to be 6 percent) that is obtained in terms of nominal interest ($i_{r, \text{nominal}}$) and annual inflation rate (f_r) according to equation (20):

$$i_r = \frac{(i_{r, \text{nominal}} - f_r)}{(1 + f_r)} \quad (20)$$

CRF and K are annual payments present value and constant factor defined by (21, 22):

$$CRF(i_r, R) = \frac{(1 + i_r)^R - 1}{i_r (1 + i_r)^R} \quad (21)$$

$$K_i = \sum_{n=1}^{y_i} \frac{1}{(1+i_r)^{n \times l_i}} \quad (22)$$

Y and L are the number of replacements and the useful life of the equipment requirements, respectively. Ultimately, the objective function for sizing is defined as (23):

$$J = \min_x \left\{ \sum_i NPC_i + C_{fuel} \right\} \quad (23)$$

In the above statement, i is the outfit and X is a seven and ternary vector of optimization variables and C_{fuel} is the cost of diesel fuel, which is considered constant. The objective function to be optimized with regard to the constraints 24 and 25:

$$0 \leq N_i \leq N_{i \max} \quad (24)$$

$$C_{bat, \min} \leq C_{bat(t)} \leq C_{bat, \max} \quad (25)$$

VI. NSIMULATION RESULTS

Table (3) shows the results of Binary Genetic Algorithm for three 9, 13 and 34 bus networks. Table (4) shows the results of Binary Genetic Algorithm for three 9, 13 and 34 bus networks for locating the photovoltaic (PV). As Table (3) shows losses are very good. Table 4 shows losses at presence of PV, In this case, we have also reductions. Convergence algorithms for 9, 13 and 34 networks are presented in Figs. 8 to 13. The results of the proposed hybrid system is given in Table (5).

Table 3. Results of binary genetic algorithms

Case study (IEEE)	Algorithm	Stage operation	DG Placement	size DG (MW)	size DG (MVAR)	Ploss (KW)	Qloss (KVAR)	Percent reduce losses	
								Active%	Reactive%
9bus	GA	Normal				784.3	1036.6		
		1 DG	9	2.9736	0.957	224.4	381	71.38	63.24
13bus	GA	Normal				465.9	365.6		
		1DG	8	2.9883	0.9912	265.6	208.9	42.99	42.86
34bus	GA	Normal				221.7	65.1		
		1 DG	27	2.9355	0.999	58.5	14.6	73.61	77.57

Table 4. Results of binary genetic algorithms(BGA) for photovoltaic (PV)

Case study (IEEE)	algorithm	Stage operation	DG placement	size DG (MW)	Ploss (KW)	Qloss (KVAR)	Percent reduce losses	
							Active%	Reactive%
9bus	GA	Normal			784.3	1036.6		
		1 PV	9	2	322.9	541.6	58.82	47.75
13bus	GA	Normal			465.9	365.6		
		1PV	8	2	323.8	253.8	30.5	30.57
34bus	GA	Normal			221.7	65.1		
		1PV	31	1.998	104.9	29.9	52.68	54.07

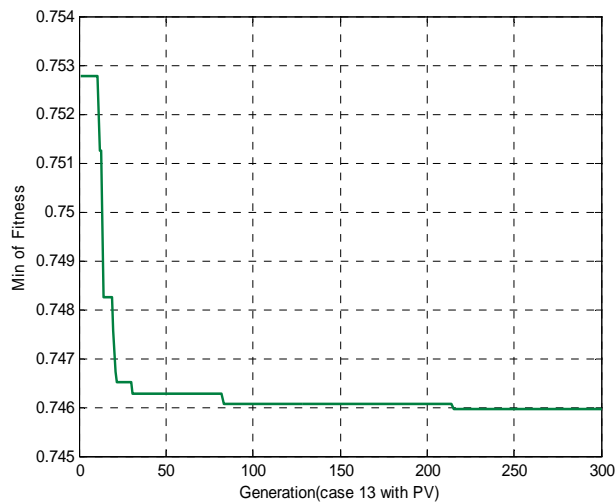


Fig.8 BGA convergence for 9- bus network of distributed generation with PV

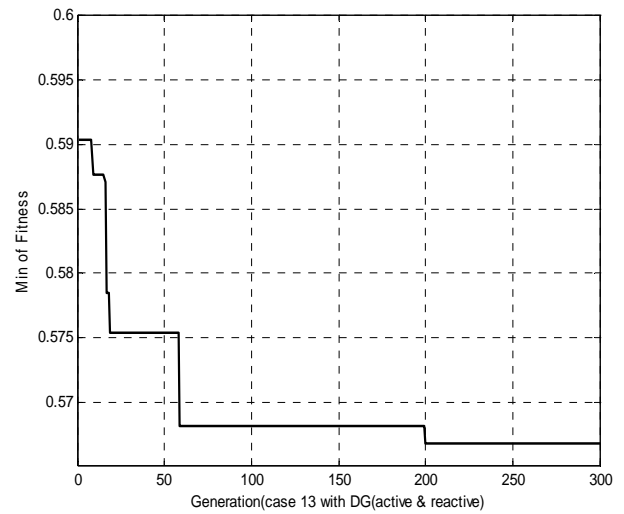


Fig.11 BGA convergence for 34- bus network of distributed generation with PV

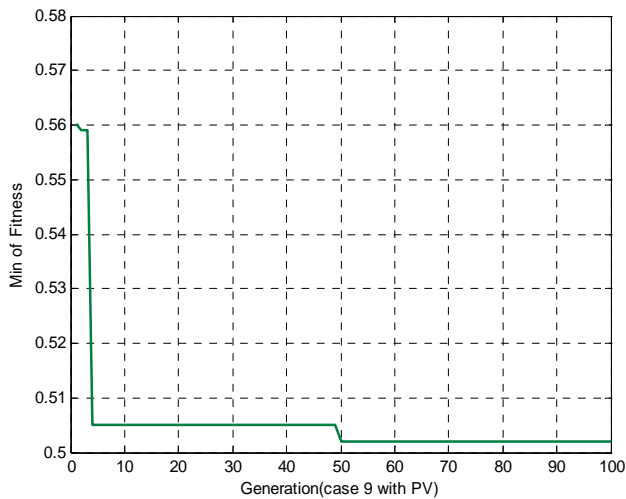


Fig.9 BGA convergence for 13- bus network of distributed generation with PV

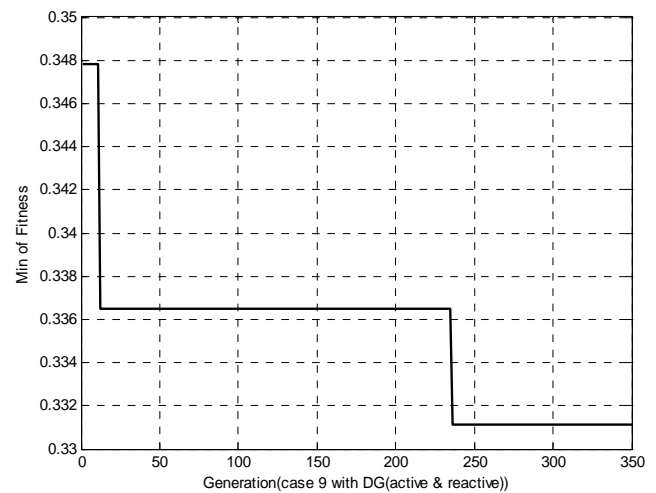


Fig.12 BGA convergence for 9- bus network of distributed generation (active and reactive)

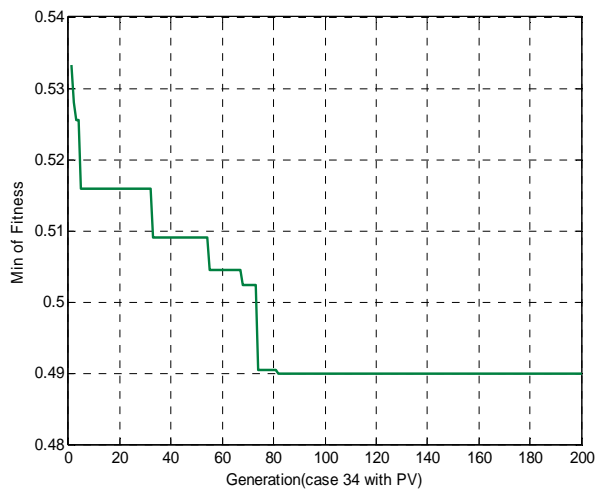


Fig.10 BGA convergence for 13- bus network of distributed generation (active and reactive)

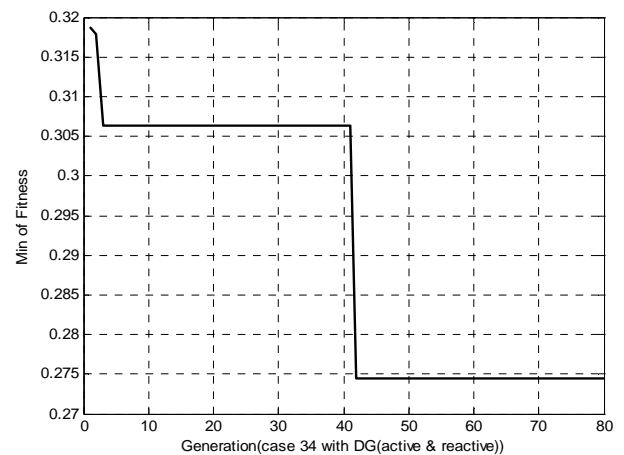


Fig.13 BGA convergence for 34- bus network of distributed generation (active and reactive)

Table 5 shows the value of calculated DG in Table 3 as proposed hybrid system including photovoltaic and fuel cells and photovoltaic systems and wind turbines that have been expressed by PSO algorithm. DG value for all networks is 2.9 MW, 0.9 MVAR (the proposed value by BGA is 2.9 MW, 0.9

MVAR for all networks). The hybrid system is sized based this value. As Table 5 shows photovoltaic and fuel cell hybrid system has the lowest cost. Fig. 14 shows comparisons and the convergence of the hybrid systems based on Table 5.

Table 5.the proposed hybrid system

hybrid systems propose	capacity of PV (kw)	capacity of FC (kw)	capacity of wind turbine (kw)	total cost NPC (\$)
System PV, Fuel cell	1900	1000	0	16320777.435
System PV, wind	1900	0	1001	16320777.435
System PV, wind,Fuel cell	1900	451	552	16342204.385

Fig. 14 compares the net per value cost and PSO algorithm convergence. Table 6 shows hybrid systems including photovoltaic and fuel cell, electrolyzer, photovoltaic systems and tanks, the number of batteries and wind turbines. NPC convergence for sizing of photovoltaic, wind and fuel cell systems, electrolyzer, converter, battery, hydrogen tanks are given in Fig. 15.

Table6. Hybrid Systems

hybrid systems propose	systems PV, Fuel ,electrolyzer, cell,battrry,tank,converter
Capacity of electrolyser	60
Capacity of converter(kw)	1713
capacity of PV (kw)	803
capacity of FC (kw)	18
Tank(kg)	8
Number of wind turbine	18
Number of battery	14504
total cost NPC (\$)	43424564.0978

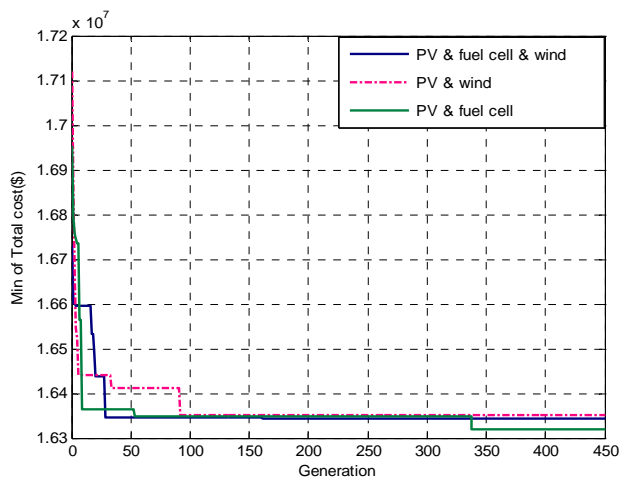


Fig.14 Compare the total cost of NPC and the convergence of PSO algorithm for sizing photovoltaic systems, wind and fuel cell

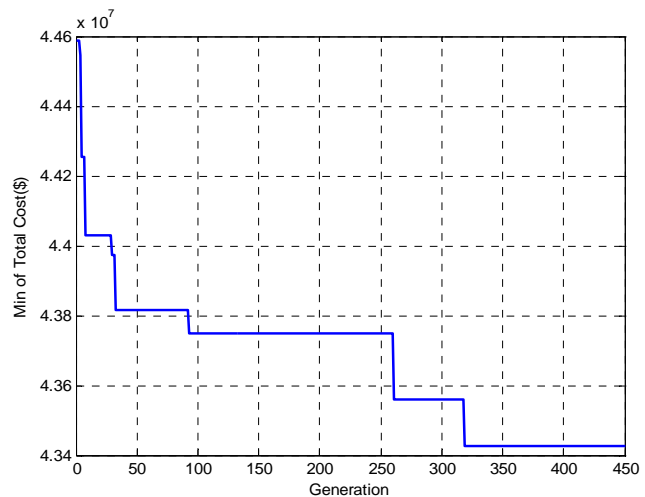


Fig.15 the convergence of PSO algorithm for sizing photovoltaic systems, wind, fuel cells, electrolyzer, converter, battery, hydrogen tanks

As can be seen that hybrid system including photovoltaic (PV) and fuel cell has the less costs. Figs 9, 13 and 34 show voltage profile curves of the hybrid system and non-state hybrid system including a photovoltaic (PV) and fuel cell network in (16, 17, and 18) bus networks. As can be seen at presence of hybrid system voltage profile is improved well and all the networks are ranged between 0.95 to 1.05.

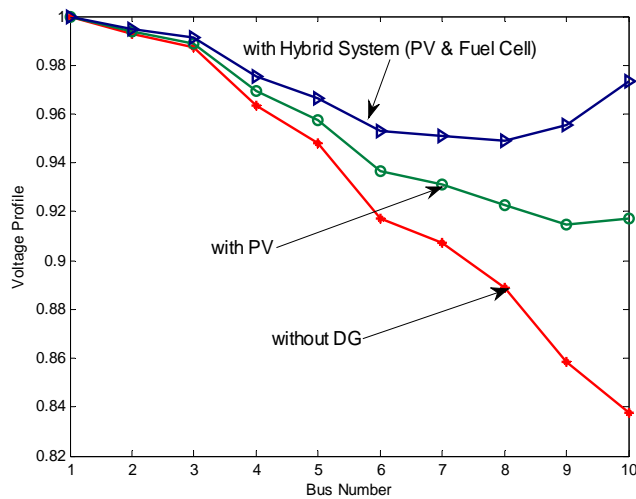


Fig.16 voltage profile in the 9-bus network

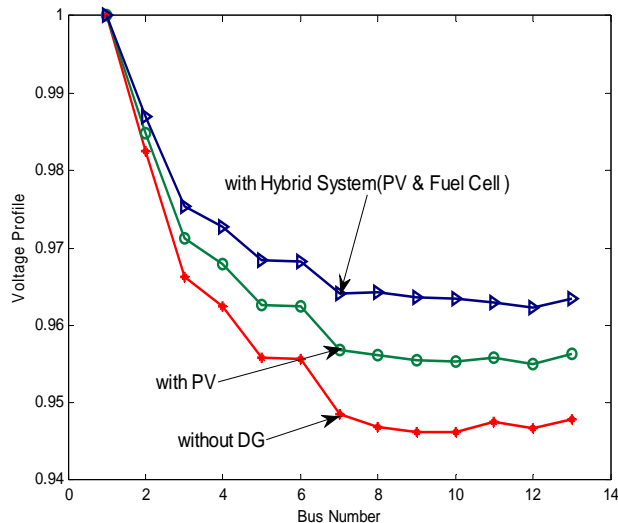


Fig.17 voltage profile in the 13-bus network

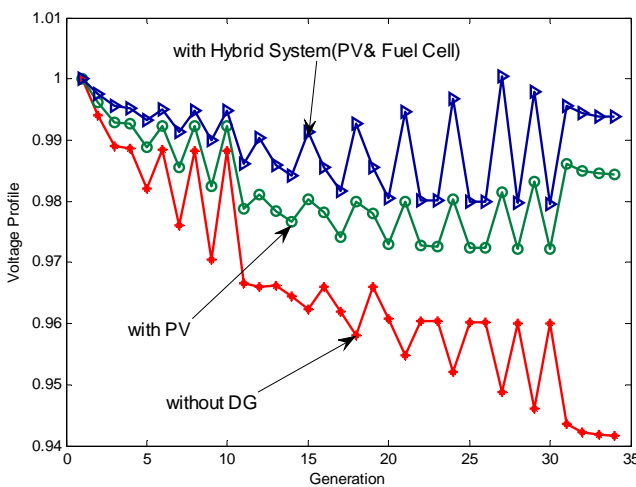


Fig.18 voltage profile in the 34-bus network

VII. CONCLUSION

The use of hybrid systems in distribution networks is increasing because of their immense benefits. This paper uses genetic algorithm to reduce losses and improve the voltage profile of the distributed generation (DGs) and the best location and optimal size of this view was expressed. Then, the value obtained by the binary genetic algorithm (BGA) was hybridized using Particle Swarm Optimization (PSO) and then voltage profile was studied at presence and without presence of hybrid system. The results approve the suggested method, since wrong locating and optimal sizing leads to increased losses the voltage profile getting out of range.

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Effects of Putrescine and Salicylic acid on Flowering Characteristics of Ornamental plant *Gazania* (*Gazania splendens*)

A. Salehi Sardoei¹, M. Shahdadneghad²

¹Young Researchers Club, Jiroft Islamic Azad University, Jiroft Branch, Iran.
(phone: 098-09139570747; e-mail: alisalehisardoei1987@yahoo.com).

²Young Researchers Club, Jiroft Islamic Azad University, Jiroft Branch, Iran.
(phone: 098-09379373231; e-mail: mojganshahdad@yahoo.com).

Abstract—A pot experiment was conducted in a completely randomized design, to study the effect of putrescine (PUT) and Salicylic acid (SA) application 50, 100 and 150 ppm was compared to the control (distillated water) on flowering *Gazania* (*Gazania splendens*). Results were analyzed by SPSS software and Duncan test. Results showed that PUT and SA had positive effect on the number of days to flowering, number of florets per stand and other vegetative traits. Mean comparisons results indicated that the highest number of florets per plant (788.33) and the lowest number of days to flowering (128.20 days) were achieved by application of 150 ppm of PUT. The lowest number of florets per plant was achieved in control treatment (515.33) which was significantly different from 150 ppm of PUT. The highest number of days to flowering was obtained by 150 ppm of SA (139.70).

Abbreviations: Put, Putrescine; SA, Salicylic acid.

Key words: *Gazania*, Flowering, ornamental plants, Salicylic acid, putrescine.

INTRODUCTION

Putrescine, Spermine, and Spermidine are polyamine compounds playing role in different stages of growth cycle, such as cell division, differentiation, flowering, fruit ripening, embryogenesis, aging and rooting. Besides, the above mentioned compounds are considered as secondary messengers, carbon and nitrogen resources in culture medium [1]. Using different concentrations of Putrescine on leaves increased the height, fresh and dry weight of *Plargunium graveolense* L. [2]. Also, spraying Putrescine on

Chrysanthemum indicum L. leaves increased number and diameter of its flowers, fresh and dry weight, and carbohydrate [17]. Spraying the solution of Putrescine and Thiamine on Dahlia plant (*Dahlia pinnata* L.) increased the plant's height, number of branches, number of leaves, fresh and dry weight of leaves, stem diameter, and fresh and dry weight of stem [17]. Besides, using Putrescine and Glutamine on leaves, separately or together, increased the height, number and weight of leaves, fresh and dry weight of plant, leaf area, and length of bulbs, weight and diameter of bulbs, and fruiting and quality of bulbs [3]. Using Putrescine and Tryptophan on leaves of Vinca [*Catharanthus roseus* L.] increased the growth, photosynthetic pigments [chlorophyll a, b and Carotenoids], soluble and insoluble sugars, protein, and total alkaloids [24]. Using Putrescine on the leaves of Egyptian Paper Flower [*Bougainvillea glabra* L.] led to increase in plant height, number of leaves and branches, diameter, fresh and dry weight of stem, leaf and root. Also, application of Putrescine and Puclobutrazol on the leaves increased the number of flowers, fresh and dry weight of flower, and its chemical compounds [7].

Salicylic acid is the most readily accessible plant growth regulators which are effective in other forms of acetyl salicylic acid and methyl salicylate in plant as well [24] (22). Salicylic acid could induce the alternative oxidase enzyme activity in mitochondria which is involved in stress alleviation mechanism and enhancing or reduction in specific secondary metabolites of plants is reported (22; 16; 25; 9; 21; 6). Salicylic acid and its derivatives are widely in use to enhance fruits postharvest life by controlling their firmness [10]-[11]-[12]-[13]-[14]-[15]. Salicylic acid has been

documented to enhance flesh firmness of harvested peaches during storage and banana fruits during ripening [26].

Since characteristics like increase of flowering period, emerge of florets, number of florets characteristics are considered as quality improvement and commercialization factors in *Gazania* ornamental plant, and also regarding the direct and indirect role of Putrescine and Salicylic acid on in forming and emerging of the flowers and vegetative parts of other ornamental plants, different concentrations of Putrescine and Salicylic acid was tested in the form of spraying on the plant to approach the mentioned aims.

MATERIAL AND METHODS

This research is a experiment in the framework of completely Block randomized design with seven treatments of putrescine and Salicylic acid application [50, 100 and 150 ppm] was compared to the control [distillated water] and four repeats in the research farming of the Agricultural and Natural Resources University of jiroft in 2012 year.

Gazania seeds were germinated, transplanted into media and grown-on for 150 days. Uniform plants 15 with 7-8 leaves of *Gazania* were put in block with the lenght of 150 and 100 cm, cultivation. Then the plant was kept in 23 ± 2 centigrade degrees and relative humidity of $70 \% \pm 5\%$. For

each pot was used 100 cc of solution at each stage [two stages] with 10 days intervals [1].

At the first week of October 2012, the following data were recorded: Number day of first flowering, Number of flowers/plant and number of flowers 115, 130, 145, 160, 175, 190, 205 and 220 Day after spray.

Data Analysis

Analysis was performed on data using SPSS 16. Comparisons were made using one-way analysis of variance [ANOVA] and Duncan's multiple range tests. Differences were considered to be significant at $P < 0.05$.

RESULT AND DISCUSSION

Results showed that PUT and SA had positive effect on the number of days to flowering, number of florets per stand and other vegetative traits. Mean comparisons results indicated that the highest number of florets per plant [788.33] and the lowest number of days to flowering [24] (128.20 days) were achieved by application of 150ppm of PUT. The lowest number of florets per plant was achieved in control treatment [515.33] which was significantly different from 150ppm of PUT. The highest number of days to flowering was obtained by 150ppm of SA [139.70].

Table 1- Effect of putrescine and Salicylic acid on number flowers of *Gazania spelendens* plant during [2011/2012] mean of seasons

concentrati on	Day after spray							
	115	130	145	160	175	190	205	220
PUT								
50	6 a	20.66 a	112.33 a	137 d	122.6 6 a	78 bcd	55 c	94 bc
100	5.33 a	20.36 a	101.33 ab	138 d	111 ab	100.33 ab	54 c	87.33 c
150	6.33 a	16 ab	94 ab	145.3 3 cd	100 bc	136 a	62.33 bc	169 a
SA								
0	5 a	16 ab	111 a	182 a	117.6 6 ab	110.67 ab	88 ab	142.67 ab
100	4.33 ab	16.33 ab	108 a	157 bc	91.66 c	90.67 bc	62.33 bc	99.67 bc
150	2.66 b	11 b	84.33 b	170 ab	99.33 bc	62 cd	55 c	81 c
control	2.33 b	15 ab	83 b	153 bcd	106 abc	51.33 d	49 c	58.67 c
C.V	26.93	20.36	11.10	6.35	9.64	16.84	25.29	27.10

Means followed by same letter are not significantly different at $P < 0.05$ probability using Duncan's test.

The highest number of floret per plant 175 days after cultivation (early march) was achieved in 150 ppm of PUT [6.32] and the lowest number was obtained in control treatment [2.33] showing significant difference. Table 1 shows that control treatment had the highest number of florets in 130, 145 and 175 days after cultivation with average of 20.66, 112.33 and 122.66 which was declined by increase in air temperature. After 160 and 205 days after cultivation, the highest number of florets was obtained in 50 ppm of SA as 182 and 88, respectively; whereas the lowest number in these dates was achieved in 50 ppm PUT [137] and control treatment [49].

It can be concluded that treatment of 150 ppm PUT with the lowest number of days to flowering, the highest number of florets per plant and the highest number of floret in 115, 190 and 220 days after cultivation had more positive effect compared to other treatments. Compared to salicylic acid, PUT levels showed better effect regarding flowering and duration of flowering period and resulted in reduction of floret number as the air temperature was raised.

These results are in good harmony with those obtained by Mahgoub *et al.*, [18] on *Dahlia pinnata* L. plant. PAs. [i.e. putrescine, spermine and spermidine] are low molecular weight polycations, which are involved in the regulation of growth and stress, probably by binding to negatively charged macromolecules [20].

Couee *et al.*, [24] (4) indicated that, the stimulation of polyamines to root growth and development may be related to the high flexibility of polyamine metabolism and the metabolic link between polyamine and ethylene synthesis which strongly suggest that, polyamines may play a role in environmentally induced plasticity of root development.

Mahgoub *et al.*, [19] hypothesized that foliar application of Put.at 200 ppm to *Dianthus caryophyllus* plants significantly increased number of flower/plant. Youssef *et al.*, [27] on *Datura innoxia* stated that application of phenylalanine at 100 ppm + putrescine at 100 ppm significant parameters in all growth parameters at flowering stage.

In addition, Rowland *et al.*, [23] found that PAs are also part of the overall metabolism of nitrogen's compounds. PAs, [i.e. putrescine, spermine and spermidine] are low molecular weight polycations, which are involved in the regulation of growth and stress, probably by binding to negatively charged macromolecules [20].

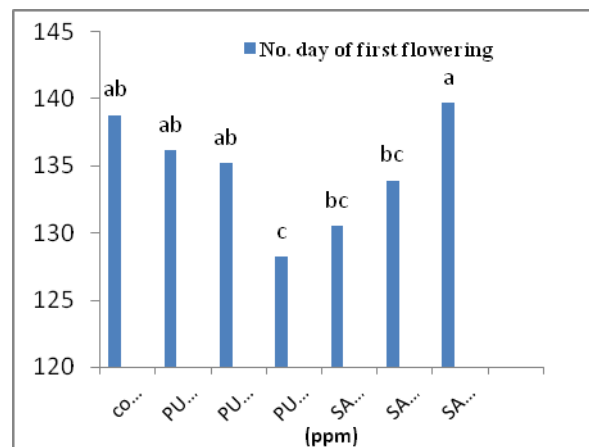


fig 1- The Putrescine and Salicylic acid effects on No. day of first flowering in leaf *Gazania splendens*

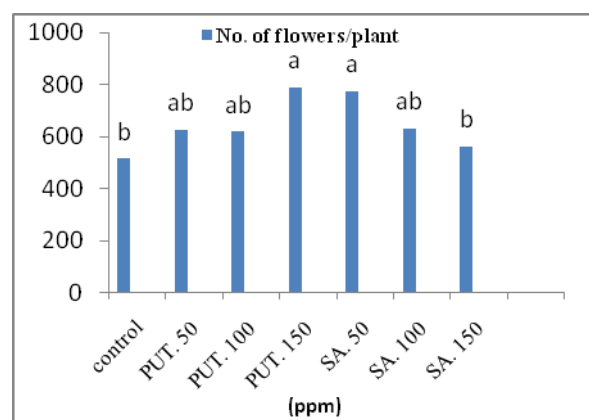


fig 2- The Putrescine and Salicylic acid effects on No. day of flowers/plant in leaf *Gazania splendens*

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Effects of Putrescine and Ascorbic acid on Flowering Characteristics of Ornamental plant *Petunia hybrid*

A. Salehi Sardoei¹, M. Shahdadneghad²

¹Young Researchers Club, Jiroft Islamic Azad University, Jiroft Branch, Iran.
(phone: 098-09139570747; e-mail: alisalehisardoei1987@yahoo.com).

²Young Researchers Club, Jiroft Islamic Azad University, Jiroft Branch, Iran.
(phone: 098-09379373231; e-mail: mojganshahdad@yahoo.com).

Abstract—A pot experiment was conducted in a completely randomized design, to study the effect of putrescine (PUT) and Ascorbic acid (AS) application (50 and 150 ppm) was compared to the control (distillated water) on flowering *Petunia hybrid*. Results were analyzed by SAS software and Duncan test. The lowest number of days to flowering (132.32 days) and the highest number of floret (8341.7) was observed for 150 ppm of AS. The highest number of days to flowering (144.10 days) was achieved in 150 ppm Put and the lowest number of floret (5402) was observed for control treatment. By increasing AS concentration up to 150 ppm, the number of floret in 130, 145, 160, 190, 205 and 220 days after cultivation was 137.67, 479.33, 1188.3, 1578.3, 1587.3 and 1523, respectively.

Abbreviations: Put, Putrescine; AS, Ascorbic acid.

Key words: Gazania, Flowering, ornamental plants, Ascorbic acid, putrescine.

INTRODUCTION

Petunia [*Petunia hybrid*] belongs to the Solanaceae family [18]. *Petunias* are perennials in warm climates and are used mainly as annual bedding and container plants in temperate zones [9]. Sphagnum peat moss is derived from dead organic material that accumulates in the lower levels of a sphagnum bog and is used as a soil conditioner and/or replacement by gardeners [10].

Putrescine, Spermine, and Spermidine are polyamine compounds playing role in different stages of growth cycle, such as cell division, differentiation, flowering, fruit ripening, embryogenesis, aging and rooting. Besides, the

above mentioned compounds are considered as secondary messengers, carbon and nitrogen resources in culture medium [3]. Using different concentrations of Putrescine on leaves increased the height, fresh and dry weight of *Plargunium graveolense* L. [5]. Also, spraying Putrescine on *Chrysanthemum indicum* L. leaves increased number and diameter of its flowers, fresh and dry weight, and carbohydrate [14]. Spraying the solution of Putrescine and Thiamine on Dahlia plant (*Dahlia pinnata* L.) increased the plant's height, number of branches, number of leaves, fresh and dry weight of leaves, stem diameter, and fresh and dry weight of stem [Mahgoub et al., 2011]. Besides, using Putrescine and Glutamine on leaves, separately or together, increased the height, number and weight of leaves, fresh and dry weight of plant, leaf area, and length of bulbs, weight and diameter of bulbs, and fruiting and quality of bulbs [4]. Using Putrescine and Tryptophan on leaves of Vinca (*Catharanthus roseus* L.) increased the growth, photosynthetic pigments [chlorophyll a, b and Carotenoids], soluble and insoluble sugars, protein, and total alkaloids [Talaat et al., 2008]. Using Putrescine on the leaves of Egyptian Paper Flower (*Bougainvillea glabra* L.) led to increase in plant height, number of leaves and branches, diameter, fresh and dry weight of stem, leaf and root. Also, application of Putrescine and Puclobutrazol on the leaves increased the number of flowers, fresh and dry weight of flower, and its chemical compounds [12].

Ascorbic acid [AS] is an organic compound required in trace amount to maintain normal growth in higher plants [17]. AS influence mitosis and cell growth in plants [16]-[19], affects phytohormone-mediated signaling processes during the transition from the vegetative to the reproductive phase as well as the final stage of development and

senescence [8]. Furthermore, AS affects nutritional cycle's activity in higher plants and plays an important role in the electron transport system [13]. It is also important as a cofactor for a large number of key enzymes in plants [6].

Since characteristics like increase of flowering period, emerge of florets, number of florets characteristics are considered as quality improvement and commercialization factors in *Petunia hybrida* ornamental plant, and also regarding the direct and indirect role of Putrescine and Ascorbic acid on in forming and emerging of the flowers of other ornamental plants, different concentrations of Putrescine and Ascorbic acid was tested in the form of spraying on the plant to approach the mentioned aims.

MATERIAL AND METHODS

This research is a experiment in the framework of completely Block randomized design with five treatments of putrescine and Ascorbic acid application [50 and 150 ppm] was compared to the control [distillated water] and four repeats in the research farming of the Agricultural and Natural Resources University of jiroft in 2012 year.

Petunia hybrida seeds were germinated, transplanted into media and grown-on for 150 days. Uniform plants 15 with 7-8 leaves of *Petunia hybrida* were put in block with the lenght of 150 and 100 cm, cultivation. Then the plant were kept in 23 ± 2 centigrade degrees and relative humidity of $70\% \pm 5\%$. For each pot was used 100 cc of solution at each stage [two stages] with 15 days intervals [Abdel aziz nahed et al., 2009].

At the first week of October 2012, the following data were recorded: Number day of first flowering, Number of flowers/plant and number of flowers 130, 145, 160, 175, 190, 205 and 220 Day after spray.

Data Analysis

Analysis was performed on data using SPSS 16. Comparisons were made using one-way analysis of variance [ANOVA] and Duncan's multiple range tests. Differences were considered to be significant at $P < 0.05$.

RESULT AND DISCUSSION

The lowest number of days to flowering [132.32 days] and the highest number of floret [8341.7] was observed for 150ppm of AS. The highest number of days to flowering [144.10 days] was achieved in 150 ppm Put and the lowest number of floret [5402] was observed for control treatment. By increasing AS concentration up to 150 ppm, the number of floret in 130, 145, 160, 190, 205 and 220 days after cultivation was 137.67, 479.33, 1188.3, 1578.3, 1587.3 and 1523, respectively. Regarding the effect of thiamine, it was found that the best results in cormlets and florets parameters were obtained by using 100 ppm. Our results are compatable with those obtained by Wahba *et al.*, [38.67] (22) on *Antholyza acthipoica* L. , and El-Fawakhry and El-Tayeb [11] on chrysanthemum, they found that foliar application of amino acids led to the increment of flowering parameters and found that amino acids produced a high quality of inflorescences.

Table 1. Effect of putrescine and Ascorbic acid on number flowers of *Petunia hybrida* plant during (2011/2012) mean of seasons

concentration	day after spray (DAS)						
	130	145	160	175	190	205	220
PUT							
50	75 b	431.33 ab	1147.6 ab	1830.7 a	1337 ab	1143 b	802 b
150	52 b	370.67 b	972 ab	1395 ab	1044 b	1031.67 b	643.7 b
AS							
50	38.67 b	406 ab	1006 ab	1409.3 ab	1095 b	969 b	657 b
150	137.67 a	479.33 a	1188.3 a	1804.3 ab	1578.3 a	1587.3 a	1523 a
control	40 b	367 b	8753.3 b	1286.3 b	1044.3 b	944 b	811 b
C.V	21.33	9.39	9.92	12.31	13.99	8.59	14.54

Means followed by same letter are not significantly different at $P < 0.05$ probability using Duncan's test.

It has been reported that application of vitamin in the form of spraying in rosemary and gladiolus has positive effect on vegetative growth, flowering and chemical compounds [Abdol Aziz nehad et al, 2009]. The lowest number of floret in 130 days after cultivation was achieved in 50 ppm AS [38.67] while the parameter in 220 days after cultivation was obtained in 150 ppm AS [643.7]. the number of floret for control treatment in 145, 160, 175, 190 and 205 days after cultivation was 367, 8753.3, 1286.3, 1044.3 and 944. The lowest number of floret was observed during mid March and early April, which was increased during May and June. *Petunia hybrida* flowering peak was observed in April and May which was reduced by increase in air temperature. Exogenous application of Asc.increased reproduction of other plant species as Balbaa [7] on *Tagetes minuta* L., Talaat [20] on sweet pepper plant, Youssef and Talaat [23] on rosemary plants, Abdel -Aziz et al [1] on *Khaya senegalensis* and Abdel Aziz et al., [2] on syngonium plants. Smiroff [19] mentioned that ascorbat has been implicated in regulation of cell division. In this concentration, the author pointed out that cell wall ascorbate and cell wall localized ascorbate oxidase has been implicated in control of growth, high ascorbate oxidase activity is associated with rapidly expanding cells.

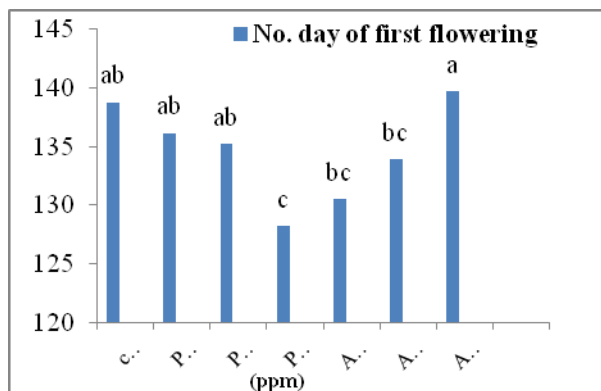


Diagram 1- The Putrescine and Salicylic acid effects on No. day of first flowering in leaf *Gazania splendens*

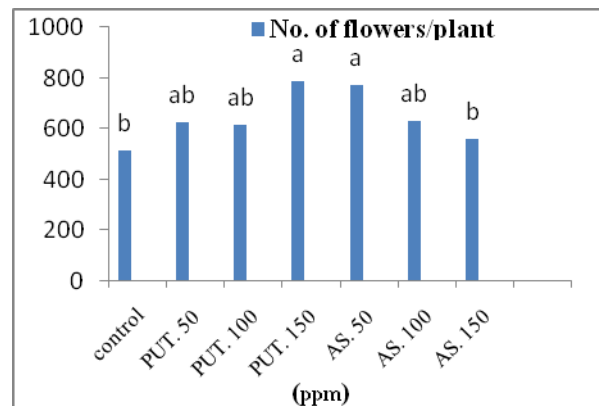


Diagram 2- The Putrescine and Salicylic acid effects on No. day of flowers/plant in leaf *Gazania splendens*

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Physical Properties of Particleboard Made of Canola Stalk

S. Akbari*, and B. Nosrati

Abstract— In this Study, physical properties of the particleboard made of canola straw mixed with Poplar particle was studied. The percent ratio of the mixture of canola straw and spruce particleboards at five levels (98%, 93.75%, 87.50%, 81.25% and 77%) and melamine formaldehyde resin to urea formaldehyde ratio as an adhesive at five levels (23%, 18.75%, 12.50%, 6.25% and 2%) and the particleboard mat moisture at five levels (10%, 12%, 15%, 18%, 20%) were chosen as variables. The physical properties such as water absorption and thickness of the particleboards are measured after they were immersed into water. According to the results, the increase in the ratio of canola straw to Poplar particle up to 87% increased the boards' water absorption and swelling, but above this value, they will decrease. According to the results of ANOVA the best treatment of the boards made of 82.65% canola, MF to UF as 6.25% and the moisture 18% using RSM was chosen as the optimum.

Keywords—Particleboard, Urea Formaldehyde, Melamine Formaldehyde, Canola Straw

I. INTRODUCTION

Today due to the decrease of forests and lack of wood sources, one hand, and on the other hand the supply of raw materials for wood and paper industries needs an extensive and universal planning in order that the industries' lack of wood materials is removed. Studies show that agricultural wastes can be a good substitute for wood to be used for constructing compressed panels. Examining the usage of lignocellulose materials for making particleboards, [9] compared the properties of the boards made of bagasse, canola and hemp straw non-wooden lignocellulose materials mixed with industrial particleboards. The results showed that the properties of the boards made of hemp straw are better than the two other materials.

Rangavar et al. [2] examined the possibility of using canola straw waste for making particleboard. The results of the research showed that using canola straw for making particleboard increases the bending strength and modulus of elasticity of panels. Due to the changes in the amount of lignin, hemicellulose and cellulose in lignocellulosic wastes and their different behavior in the products made of them

compared to the wooden materials, it is necessary to examine the overall effect of different making factors on the practical properties of the panels. Hence, the effect of the moisture of the particleboard cake made of different ratios of canola straw to spruce and different ratios of melamine formaldehyde resin to urea formaldehyde on the physical properties of the particleboard were examined.

II. MATERIALS AND METHODS

In this research, particleboard was made using canola straw wastes harvested in Fars Province and Poplar at laboratory conditions. The lignocellulose and wood raw materials were kept in plastic bags in the open air with the moisture 6%. For making the test boards, the ratio of melamine formaldehyde resin to urea formaldehyde as a binder at five levels, the weight ratio of canola straw to Poplar particles at five levels and the mat moisture at five levels were chosen as independent variables.

The independent variables, their codes and amounts and the combination number of conditions used for making the specimens are presented in tables 1 and 2.

Table 1. Actual amounts and codes of variables chosen for the design used with RSM

variables' surface coding					unit	variables
1.68	1	0	1	1.68		
2	6.25	12.5	18.75	23	%	Melamine to urea (X1)
77	81.25	87.5	93.75	98	%	Canola to Poplar (X2)
9.95	12	15	18	20	%	(moisture) (X3)

The Central Composite Rotatable (CCR) matrix designed by circular points at the center of any axis of factorial space was used to estimate the regression coefficients. This diversity needs five levels of any variable. The upper limit of a factor's levels was coded as 1.68 and the lower limit was coded as -1.68.

The particleboard required for any treatment was weighed by a digital scale with the precision 0.01 and was placed on experimental adhesive apparatus. The dry resin used was taken as 10% dry weight of the wood material for any board. The resin's concentration was 60%. A wood mold with the dimensions 22×35×35 cm was used to form the particleboard cake. The resulting cake was put in a hydraulic press under the pressure 30 kg/cm² and the temperature 165°C for 660 s. Using a shablons, the boards' thickness was fixed at 16 mm.

Sajad. Akbari is with the Graduate student of multi-structure wood products, University of Zabol (corresponding author to provide phone: 09397137403; fax: 054-322-32600; e-mail: sajad.akbari@ymail.com).

Babak. Nosrati. Author is with the Department of paper and wood technology and sciences, University of Zabol. Iran. (e-mail: nosrati.babak@uoz.ac.ir).

The boards' density was fixed at 0.65 g/cm³. After the specimens were conditioned at an acclimatized room with the relative humidity 65% and the temperature 20 ± 2 °C for two weeks, they were measured and tested based on EN-310 [6] and EN-319 standards [8]. The physical properties of the test specimens were evaluated after they were immersed for 2 hours into water according to EN-312-2 (203) standard [7], including thickness swelling and water absorption.

III. STATISTICAL TEST

After performing physical tests, the results obtained were statistically evaluated and analyzed based on factorial test and RSM. This method was used to develop a mathematical model as multivariable regression equations for thickness swelling and water absorption after the prepared boards were immersed into water for 2 hours. Using RSM, the independent variables were taken as functions of a mathematical model. This mathematical model is denoted as a general quadratic polynomial (regression) model for the response surface y [4]:

$$y = \beta_0 + \sum_{i=1}^k \beta_i X_i + \sum_{i=1}^k \sum_{j=1}^k \beta_{ij} X_i X_j + \sum_{i=1}^k \beta_{ii} X_i^2 + \epsilon \quad (1)$$

IV. RESULTS

In this study, the effect of the variables including melamine formaldehyde to urea formaldehyde (X_1), the ratio of canola straw to spruce (X_2) and the cake moisture (X_3) on the physical properties of particleboard was evaluated using the regression equation based on factorial test and RSM Refer to "(1)".

$$\bar{Y} = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_{11} X_1^2 + \alpha_{22} X_2^2 + \alpha_{33} X_3^2 + \alpha_{12} X_1 X_2 + \alpha_{13} X_1 X_3 + \alpha_{23} X_2 X_3 \quad (2)$$

The resulting test values TS_{2h} and WA_{2h} can be expressed as a function of variables of particleboard construction (table 2). The regression relation between TS_{2h} and WA_{2h} and variables of construction is as follows for the coded units:

Model of equation for TS_{2h} :

$$TS_{2h} = 43.39 - 1.03X_1 + 0.90X_2 - 6.27X_3 - 3.75X_1^2 - 5.88X_2^2 - 5.74X_3^2 \quad (3)$$

Model of equation for WA_{2h} :

$$WA_{2h} = 80.62 - 2.02X_2 - 10.32X_3 - 8X_2^2 - 4.2X_3^2 \quad (4)$$

The developed (ANOVA) model was used to analyze data and describe the results. The results obtained are separately presented in ANOVA tables 3 and 4. Factors used are calculated from relations 3 and 4. As it is seen in tables, there is an ideal fit between the predicted values and the data observed ($R^2=0.90$ for TS_{2h} and $R^2=0.92$ for WA_{2h}). The Probability percent F is less than 0.05 for the response surface model in tables 3 and 4 that shows this model is statistically significant.

V. THICKNESS SWELLING (TS) AFTER IMMERSION IN WATER FOR 2 HOURS

The results obtained from thickness swelling after immersion in water for 2 hours (TS_{2h}) show that the independent effect of the weight ratio of melamine formaldehyde to urea formaldehyde and cake moisture is significant (table 3).

According to the relation 3, negative coefficients α_1 and α_2 show the increase in the ratio of melamine formaldehyde to urea formaldehyde and the cake moisture that leads to the decrease of TS_{2h} , and the positive α_2 shows the increase in the ratio of canola straw to spruce particleboard that increases TS_{2h} . In EN Standard, the minimum water absorption by particleboard is determined as 15%. The highest TS_{2h} is for the board 3 that is made of a ratio of melamine formaldehyde to urea formaldehyde 12.50%, a ratio of canola straw to spruce particleboard 87.50% and the cake moisture 15%, and the lowest TS_{2h} is for the board 16 that is made of a ratio of melamine formaldehyde to urea formaldehyde 18.75%, a ratio of canola straw to spruce particleboard 81.25% and the cake moisture 18%.

VI. WATER ABSORPTION (WA) AFTER IMMERSION IN WATER FOR 2 HOURS

The lowest water absorption (47.52%) of a board immersed in water for 2h is for the board 17 made of a ratio of melamine formaldehyde to urea formaldehyde 12.50%, a ratio of canola straw to spruce particleboard 87.50% and the cake moisture 20%, and the highest water absorption (89.19%) is for the board 20 made of a ratio of melamine formaldehyde to urea formaldehyde 12.50%, a ratio of canola straw to Poplar particleboard 87.50% and the mat moisture 10%. According to the relation 4, all linear coefficients can not affect WA_{2h} and only the mat moisture decreased the water absorption and when it increased, water absorption decreased. Table 4 shows the significant effect of the ratio of melamine formaldehyde to urea formaldehyde, the ratio of Canola stalk to Poplar particle and the mat moisture on water absorption after immersion in water for 2 hours.

Table 2. Combination of the conditions of particleboard reparation using RSM together with the results

variables values					variables coding dependent Variables			Boards Number
WA _{2h}	TS _{2h}	Moisture (%)	Canola to Poplar (%)	Melamine to urea (%)	X3	X2	X1	
74.47	35.05	15	87.50	12.50	0	0	0	1
62.61	30.16	18	93	18.75	1	1	1	2
84.31	45.15	15	87.50	12.50	0	0	0	3
84.5	45.1	15	87.50	12.50	0	0	0	4
81.79	28.97	12	81.25	18.75	-1	-1	1	5
80.04	37.62	12	93.75	6.25	-1	1	-1	6
84.49	45	15	87.50	12.50	0	0	0	7
72.21	34.93	12	93.75	18.75	-1	1	1	8
84.48	45.13	15	87.50	12.50	0	0	0	9
62.35	25.01	18	81.35	6.25	1	-1	-1	10
73.23	33.42	15	87.50	2	0	0	-1.68	11
61.47	28.4	15	77	12.50	0	-1.68	0	12
76.14	35.21	12	81.25	6.25	-1	-1	-1	13
74.22	31.04	15	87.50	23	0	0	1.68	14
52.55	20.08	18	93.75	6.25	1	1	-1	15
61.83	14.59	18	81.25	18.75	1	-1	1	16
47.52	14.83	20	87.50	12.50	1.68	0	0	17
84.51	45.11	15	87.50	12.50	0	0	0	18
53.77	23.99	15	98	12.50	0	1.68	0	19
89.11	38.31	9.95	87.50	12.50	-1.68	0	0	20

Table 3. The results from ANOVA for TS after immersion in water for 2 hours (significant relations)

Source	Sum of Squares	DF	Mean Square	F Value	P-Value Probability y >F
Model	1631.53	9	181.28	10.46	0.0005
X_1	14.38	1	14.38	0.83	0.3837
X_2	11.14	1	11.14	0.64	0.4413
X_3	536.38	1	536.38	30.96	0.0002
X_1^2	202.45	1	202.45	11.68	0.0066
X_2^2	498.56	1	498.56	28.78	0.0003
X_3^2	475.46	1	475.46	27.44	0.0004
Lack of Fit	89.11	5	17.82	1.06	0.4757
standard deviation	4.16				(correlation) $R^2 = 0.9040$
mean	32.98				estimated correlation = 0.8176
					predicted correlation = 0.5293

Table 4. The results from ANOVA for WA after immersion in water for 2 hours (significant relations)

Source	Sum of Squares	DF	Mean Square	F Value	P-Value Probability
					>F
Model	2738.43	9	304.27	13.22	0.0002
X_2	55.98	1	55.98	2.43	0.1499
X_3	1454.11	1	1454.11	63.19	<0.0001
X_2^2	981.14	1	981.14	42.64	<0.0001
X_3^2	286.12	1	286.12	12.43	0.0055
Lack of Fit	146.58	5	29.33	1.75	0.2761
standard deviation	4.80				(correlation) $R^2 = 0.9225$
mean	72.29				estimated correlation = 0.8527
					predicted correlation = 0.5293

VII. DISCUSSION AND CONCLUSIONS

Thickness swelling is a negative property for wood products that can create problems in their applications. According to the results obtained in this research, the increase in melamine formaldehyde decreases TS_{2h} . The main reason is the existence of three amino groups in melamine formaldehyde resin that creates a grid and strong structure. This makes resin resistant to atmospheric conditions [1]. Since the adhesive was used at any treatment, the increase in the adhesive's specific surface can be attributed to the canola's high swelling coefficient and its low density. The increase in the specimens' thickness swelling due to the increase of canola straw can be also attributed to the existence of sponge core and the absence of paraffin for making the boards and the results obtained are consistent with those obtained by Yousefi *et al.* [10]. The amounts of cellulose and hemicellulose extractives in the wooden material mixture are factors affecting the board's water absorption and thickness swelling [3]. Therefore, since lignin is lower in non-wooden materials and canola straw in this research, water absorption and thickness swelling are higher in the boards made of canola straw weight ratio. The cake's moisture is a factor affecting the level of water absorption. According to the results of the research, increasing the cake's moisture, water absorption decreases, that can be due to the increase in particleboards compaction due to the increase of the cake's moisture and it is also supported by Casey and Kamke [5].

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The Relationship between Body Types and Self-Confidence in Young People (18-25 Years) in Marivan

Ali Mostafazadeh¹ and Fatemeh Rostami²

1. M.S. in Education and B.A. in Counseling; havre_2000@yahoo.com

2. B.A. in Physical Education

Abstract— The relationship between body types and self-confidence was studied among the men and women of the 18-30 years age group in Marivan. The statistical population consisted of women and men between 18 and 30 years of age residing in Marivan. Of these, 50 were randomly selected for the study, and subsequently filled in the research questionnaires. The Coopersmith Self-esteem Inventory (SEI) was used as a criterion for measurement. Data analysis was conducted via the SPSS16, and the descriptive (mean value and standard deviation) as well as inferential statistics (variance analysis) were implemented for the collected data. The results showed that there was a significant relationship in men between self-confidence and body type ($p \leq 0.05$), whereas no such relationship was observed among women ($p > 0.05$).

Keywords— Body types, Marivan, self-confidence/self-esteem.

I. INTRODUCTION

Considered as a fundamental and significant characteristic of every individual's personality, self-confidence is an important topic in Psychology, and undoubtedly affects different aspects of human character. Self-confidence is defined as a perspective which enables one to adopt a realistic and positive attitude towards oneself as well as to exert control on one's own life. Therefore, possessing a certain measure of self-confidence throughout life is considered as a fundamental human need. Always regarded as a personal necessity, self-confidence has gained particular prominence during the past decade. Personality type is considered as a factor that can affect an individual's self-confidence. The purpose of the present study is to investigate the relationship between body types and self-confidence among women and men in the 18-30 years age group in the City of Marivan.

The history of self-confidence can provide a deep-insight in this regard which has its origins in the past centuries.

True self-confidence can be sought among the great men and women throughout history including Imam Mohammad Qazali, Molavi (also called Rumi), Freud, Erikson, Rogers, Sullivan, and many other unknown scientists whose knowledge and wisdom we have inherited without being able to acknowledge them by their names. Therefore, the following approaches can somehow be merged [3]:

- 1) Islamic ideological and divine views on self-esteem and dignity
- 2) Detailed Western views on the sustainability of self-confidence

Otto Fenichel used vast resources in this regard which draw our attention to the wide expanse of self-confidence. Addressing the Freudian and neo-Freudian schools is also seemingly inevitable.

Studying and criticizing the theoretical and practical views expressed by Sigmund Freud, Adler, Karen Horney, Eric Erickson, and Karl Jung, as well as regarding Avicenna's, Imam Mohammad Qazali's and other great Islamic personalities, could bring us the gift of self-confidence/self-esteem. The practical definition of self-esteem is "the respectful feelings one has towards one's self" [3].

Definitions of Self-confidence

"The existence of an independent power in one's self through which one can start things and bring them to an end without receiving help from others" [7].

"The ability arising from self-reliability to take error-free strides towards maintaining individual and group interests" [3].

"A realistic conception held by individuals regarding their own abilities and physical-mental characteristics, as a result of which they can confront real world problems and take the best decisions at the best times." (According to the Research Deputy, Khurazgan University, Iran, 1994).

"The remembrance of past successful endeavors would increase our self-confidence, so, self-confidence is a result of

success. No doubt, every person has experienced failures and successes in her/his life. However, thinking about our successful experiences would rotate the wheels of the self-confidence mechanism" [8].

"A feeling of value, approval, and acceptance one feels towards oneself which varies in different situations" [5].

Psychological Theories on Self-Confidence

Self-confidence was first discussed publicly by Sigmund Freud. He believed that damaged self-confidence (self esteem) can result in many psychological disorders. The first mental disease Freud named in this regard was schizophrenia. Schizophrenia has been regarded as the disease of self-esteem. Thus, Freud is a genius since he made this theoretical statement in 1912, and after many years, its validity was proved in practice by other psychoanalysts. The framework of one's personality is destroyed once one's self-esteem is damaged, and this condition is most prominently exhibited in schizophrenia where the foundations of one's personality collapse (split personality).

The other disorder Freud refers to is depression which ultimately leads to the manic disorder. Depression is the result of disturbance in self-confidence/self-esteem. Freud believed psychological disorders must be based on self-esteem and symptomology, and etiology, and that therapeutics must be conducted on the same basis. Self-confidence is not a mere word, but encompasses the whole personality. It is the binding cement which connects the tiles of one's existence. Once, for some reason, this binding cement collapses, personality would disintegrate and ultimately collapse [3].

Human Development and Formation of Self-Confidence

Self-confidence is a chronological structure. In other words, its formation and building start from birth and develop through time, taking new forms in the process. A newborn possesses certain physical and mental abilities. For example, it can cry and incline its head towards an object or stimulus. A mentally retarded baby would not be able to demonstrate such normal responses. Therefore, a baby's abilities are divided into two parts: 1) Physiological abilities, e.g., moving hands, legs, the head, etc., and 2) Psychological abilities, e.g., crying, laughing, and reacting to various stimuli.

Many abilities of both kinds are genetically inherent in humans. Thus, a human being is born with a capital, namely, certain powers and abilities. Some babies possess more of this capital and some less. Abnormal slowness of movement or, conversely, hyperactivity, can be indicative of certain conditions such as: 1) Physical or physiological disability, e.g., general paralysis or epilepsy; and 2) Psychological or mental disability, e.g., mental retardation or schizophrenia [3].

Signs of Self-Confidence

True self-confidence can rarely be found. Confident People are usually very special people who have encountered various difficulties and suffered in life to reach their present high positions. They have had the strength to withstand stress and can overcome their problems. They have a strong character and arrange special plans for their lives.

In his research on world scholars, Abraham Maslow observes that these people are unusually calm in their daily activities. Their behavior is such that one thinks they have all the time in the world; they never do things hurriedly. It is as if they are already familiar with unknown meanings and concepts. They are in control of themselves. They are as strong as mountains and seem to be wise towards the unknown. Their gaze is fixed and conveys strength combined with humanity. They are simultaneously powerful and kind. Such features have been observed in the prophets of God.

Ordinary people might have only one of the above-named features, but not more. Others often stand in awe of their powerful gestures. If you accidentally pass them by, you involuntarily stop in your tracks, looking at them. They are very special people.

When Jesus Christ walked, animals would stop to stare at him and wild animals would bow to him. Why? Jesus exerted such an influence on people and animals alike. Only the prophets have a powerful and, at the same time, kind stare, whereas kings look at you with a powerful glance which bespeaks of injustice and cruelty. People in powerful positions are generally bullies, while strong people who are kind stand up to such power and tolerate pressure, crisis, and disaster, keeping their faith at the same time; the faith that says, "Whatever God wills shall happen."

If we think like these truly strong people, then we shall enjoy true self-confidence. Otherwise, we might be involved in many endeavors which might prove fruitless. Those who have high self-confidence, i.e., their movements, behavior, and speech are directed at serving their own and their family's interests devote all their time and energy to such servitude. For example, they might be lawyers without any interest in Law, or they might own a shop or a photo atelier with the sole intention of earning a living from it. In other words, they work hard and bestow their income on themselves and their families. Buying a house, a refrigerator, a car, a carpet, etc. are all these people ever think about. Due to their limited vision and life style (themselves and their family), these people who are generally devoid of artistic visions, never lose their concentration and are never affected by suspicion, reluctance, boredom, hopelessness, or absurdity [2].

Origins of Self-confidence/Self-Esteem

Human beings are like trees. Trees need strong healthy roots to absorb nutrients from soil to grow, keep fresh, grow branches, and bear fruit. Self-esteem is the roots of a person, providing him with nutrition. Our parents are the first available source for strengthening the roots of our self-esteem. Through their first contacts with their baby, they accept the baby as it is born and show this acceptance by affectionate continuous hugging and cuddling. Later, this acceptance is expressed by (practical and verbal) encouragement, patience, kindness, attention, care, etc. In short, the parents thus feed their child's roots of self-confidence. However, unfortunately some children do not receive from their parents this vital nutrition, and thus cannot develop strong roots. Such children do not learn to trust themselves or be honest with them. They grow up with a negative view of their surrounding, and turn into weak characters who cannot stand on their own feet. For living, they need the presence of other people: their family, friends, spouse, and even children. Some seek perfection, success, and innovation to feed their self-confidence roots, whereas others consider as essential personal appearance: facial and physical beauty, a house, a car, money, and other material things. All these are the building blocks of creating a solid root for developing self-confidence and should not be condemned by anyone. No one can judge which factor is more effective than the others, because everyone must determine personally what would bring him/her self-confidence [13].

Effective Factors in Creating High Self-Confidence

Many factors affect self-confidence and the way it should be created. These factors can be investigated from various perspectives in different fields. In studying psychological moods, these factors must be duly considered. Part of these factors is related to the person's childhood and adolescent periods and another part is related to sociological problems. The effect of moral aspects is very significant and has a deterministic role.

Therefore, the following factors are effective on self-confidence/self-esteem: 1) Mother's role, 2) Awareness, 3) Marriage, 4) Money and material things, 5) Motivation, 6) Honesty, 7) Anxiety, 8) Psychological background, 9) Trade, 10) Culture, 11) Intelligence Quotient (IQ), 12) Feeling good, 13) Compliance, 14) Refinement, 15) Kindness, 16) Mutual respect, 17) Narcissism, 18) Abilities, 19) Acceptance by others, 20) Logical thinking, 21) Age, 22) Gender, 23) Insight and cognition, 24) Positive feelings, 25) Efficiency, 26) Love, 27) Training, 28) Intellect/wisdom, 29) Beliefs, and 30) Perspectives.

In general, the factors affecting self-confidence are divided into two groups: 1) Strong factors [3], and 2) Weak factors [3].

Heath-Carter Anthropometric Method

In the previous section, the anthropometric method in men was considered. However, the Heath-Carter anthropometric method can be generalized to both men and women. The following methods for classifying body types are recognized:

- 1) Calibration of body image; 2) Calibration of image by an expert (when the following information is available: age, height, weight, and a standard body type image); and 3) The combined method suggested by Heath and Carter [4].

Sheldon's Theory regarding personality, unlike other more sophisticated theories that involve different interpretations, is very simple. It describes a number of physical and psychological variables (factors) and determines the relations between them. Such variables are then prioritized in determining the behaviors exhibited by human beings.

These three types are briefly described below:

1. Endomorphic: An endomorphic person has a round flexible figure. He has grown more horizontally than vertically. His bones and muscles have not developed sufficiently and lack strength. His body surface is small as compared to his volume. He has a prominent digestive system which explains the terminology used for this condition.
2. Mesomorphic: The bones and muscles in this body type are considerable. They are generally muscular people and can tolerate physical blows and injuries.

Professional sportsmen, adventurers, and soldiers are usually classified in this group.
3. Ectomorphic: People in this group are tall and slender, i.e., they have grown vertically. They have a flat chest, their ribs are visible, and their muscles are weak. The ratio of body surface to body volume is greater in this type as compared with the other body types. Also, the brain and the central nervous system are more developed than those in the other types. For this reason, ectomorphs are more prone to external stimuli and are more easily stimulated. Ectomorphs are generally weaker physically and are not well adapted for sports or other kinds of physical activity.

The following must be considered in this regard:

- a) These three classifications and their differences are purely theoretical. In practice, no one has the exact characteristics described above. That is to say, there is no pure endomorph, mesomorph, or ectomorph in reality. Rather, everyone is a mixture of the three body types. However, the features of one body type might be more dominant in certain people. The above grading system is devised exactly for stressing this point.

- b) A person currently classified as close to one of the three body groups must not, in the past, have been exposed to conditions (injury, disease, malnutrition, etc.) resulting in a permanent physical change. In other words, the person is expected to have led a relatively normal life both in the past and at present.
- c) Sheldon's anthropomorphic research was conducted on men. Nevertheless, he has conducted some research also on women, and according to his studies, the endomorphic-ectomorphic combination is more prevalent among women, whereas the combined mesomorphic-endomorphic body type occurs more often among men [4].

Role of Heredity and Environment in Body Types

Even in the most comprehensive research conducted so far, certain doubts are expressed since the relationship between human physique and his mental status is purely statistical. In fact, personality is not exclusively related to what a person has received at her/his conception. A person might be exposed to different environmental conditions during his/her development which can affect both her/his body and mind accordingly.

These differences are more prevalent if their distinctive features are more diverse. Physically, a fat person might, due to the strict diet imposed by a physician, experience changes that are against his genetic disposition. In the same way, various illnesses a person might have suffered would have a similar effect. Psychologically, a hard life accompanied by unpleasant and traumatic experiences combined with deprivation can turn an initially calm person into a dry and strong character. Of course, the environmental effects can never erase the line that was drawn initially between the person's body and mind [11]. Moreover, these changes in most cases affect the body and the mind similarly. The mind of a person whose body has experienced severe deprivation can never be immune from the associated personality disorders. Therefore, various points can be revealed from a person's life by considering her/his physical appearance [11].

II. PREVIOUS RESEARCH

No official previous research was found by the authors that could be related to the subject of this study. What research could be found was conducted purely for educational purposes. For this reason, the authors decided to be the first to conduct such a study.

III. METHODS AND MATERIALS

The causative-comparative method was used. The statistical population was the 18-30 years age group who lived in Marivan. Of this population, a 50 member sample (25 women and 25 men) was randomly selected, and the Coopersmith questionnaire was distributed among the members of this sample population. The questionnaire consisted of 35 questions with both positive and negative aspects. The

numbers of positive questions were 1, 2, 5, 6, 9, 11, 16, 17, 19, 20, 25, 26, 29, 30, 31, 32, 33, 34, and 35, and the rest were the negative questions. The scoring order was based on multiple choice questions as follows:

Positive questions: 1) I completely agree; 2) I agree; 3) I disagree; and 4) I completely disagree.

Negative questions: 1) I completely disagree; 2) I disagree; 3) I agree; and 4) I completely agree.

For the variance analysis, the descriptive statistics (mean value and standard deviation) as well as inferential statistics (variance analysis) was used.

The research hypotheses were as follows:

Hypothesis 1: There is a difference between various body types (ectomorphic, mesomorphic, and endomorphic) in terms of self-confidence.

Table I: Comparison of mean self-confidence values obtained for different body types

Body Type	X	S
Ectomorph (Thin)	97.61	10.2
Mesomorph (Muscular)	107.07	9.22
Endomorph (Fat)	97.9	7.4

According to the findings in Table I (Column X), the mean values of self-confidence for thin, muscular, and fat persons are 97.61, 107.07, and 97.7 respectively.

Table II: Variance analysis results comparing self-confidence in various body types

Variance Source	Sum of Squares	Degrees of Freedom	Mean Squares	F	p
Between Groups	1668.42	2	834.21	10.19	0.000
Inside Groups	7940.96	97	81.86		
Total	9609.3	99			

The results in Column F of Table II show that the findings are significant at a $p \leq 0.5$ significance level. Therefore, a difference in self-confidence does exist among different body types.

Table III: Pair comparison of mean self-confidence scores in terms of body types

Body Type	X	S
Thin = Muscular	-9.46	0.000
Muscular = Fat	-9.13	0.001

Based on Tukey's range test, there is a significant difference in self-confidence between the thin=muscular and muscular=fat groups (Table III).

Table IV: Comparison of self-confidence between men and women

Gender	X	S	T	p
Men	101.77	10.27	1.72	0.88
Women	98.40	9.13	1.73	0.89

The results in Column T of Table IV show that there exists a significance level of $p \leq 0.05$; therefore, there is no difference between men and women in terms of self-confidence.

Table V: Comparison of self-confidence mean values in various body types

Body Type	Mean Value	Significance Level
Ectomorph (Thin)	96.78	9.60
Mesomorph (Muscular)	103.21	8.29
Endomorph (Fat)	95.78	7.9

The results in Column X of Table V show the mean values of self-confidence among men to be 96.78 (thin), 103.21 (muscular), and 95.78 (fat).

Hypothesis 2: There is a difference between various body types in terms of self-confidence among men.

Table VI: Results of variance analysis for self-confidence in terms of body type

Variance Source	Sum of Squares	Degrees of Freedom	Mean Squares	F	p
Between Groups	1502.611	2	751.3	9.4	0.000
Inside Groups	3986.66	50	79.7		
Total	5489.2	52			

In Table VI, as the observed values of F are significant at a $p \leq 0.05$ level, there is a difference between men having various body types in terms of self-confidence.

Table VII: Pair comparison of mean self-confidence scores in terms of body types among men

Body Type	Mean Difference	Significance Level
Thin- Muscular	-13.18	0.001
Muscular -Fat	-12.20	0.001

Based on Tukey's range test results (Table VII), there is a difference in self-confidence between the thin-muscular and muscular-fat groups.

Table VIII: Comparison of mean self-confidence scores among women with various body types

Body Type	Mean Value	Significance Level
Ectomorph (Thin)	98.40	10.98
Mesomorph (Muscular)	111.58	8.425
Endomorph (Fat)	99.38	6.74

In Table VIII, the results in Column X show the mean self-confidence values among thin, muscular, and fat persons to be 98.40, 111.58, and 99.38 respectively.

Hypothesis 3: There is a difference between various body types in women in terms of self-confidence.

Table IX: Variance analysis results for self-confidence in various body types among women

Variation Source	Sum of Squares	Degrees of Freedom	Mean Squares	F	p
Between Groups	496.44	2	234.7	3.06	0.057
Inside Groups	33267.8	44	76.5		
Total	3837.23	46			

In Table IX, as the values of F are not significant at the $p \leq 0.05$ level, there is no difference in self-confidence among women with various body types.

IV. CONCLUSION

The present research was aimed at studying the relationship between self-confidence and various body types in men and women of the 18-30 years age group in Marivan. The research hypotheses were as follows:

- 1) There is a difference in terms of self-confidence among various body types (thin, muscular, and fat).
- 2) There is a difference in terms of self-confidence among men with various body types.
- 3) There is a difference in terms of self-confidence among women with various body types.

The first hypothesis which addressed the self-confidence of various body groups was statistically significant. In other

words, the mean self-confidence values obtained for thin, muscular, and fat groups were 97.61, 107.7, and 97.9 respectively. Therefore, it was shown that a significant relationship existed between self-confidence and various body types.

The second hypothesis addressed the self-confidence among men with regard to their body type. According to Table VI, the value of t was significant at a $p \leq 0.05$ level. Therefore, there is a difference in men's self-confidence based on their body types. The Tukey test also indicated a difference in self-confidence between thin-muscular and fat-muscular groups.

Finally, the third hypothesis addressed the difference in self-confidence among women with various body types. The mean self-confidence values obtained for thin, muscular, and fat types were 98.40, 11.58, and 99.38 respectively. Considering Table 9, we observe that F is not significant at a $p \leq 0.05$ level. Therefore, there is no difference in terms of self-confidence among women in terms of body type.

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The application of nanotechnology to eliminate environmental pollution

Sepher Khorami, Sahand Khorami and Alireza Safaei

Abstract—Environmental Protection is an effective approach which is arising from the experiences of practitioners and environmental analysts in the world. According to the importance of human role as development purpose on one hand and the environment as human activity's area in another hand, the healthy environment is noticeable for all generations. Harmful particles that have been pumped in the air such as lead, copper, zinc, iron, chromium and nickel are due to the human's activities like heavy traffics of vehicles. high levels of air's ultrafine particles with a diameter less than 10 micrometers can be attributed to increased cardiovascular and respiratory diseases. In this study, we have investigated on using environmental catalyst in order to purify exhaust gas and refining climate as a low-cost alternative.

Keywords—Photo catalysts, Nanotube, environmental

I. INTRODUCTION

Each branches of science has its own topic and their main distinctions are because of their topic discussion. Human knowledge about organism and their specificities are categorized in biology science. Because of extent of sub-branches in biology, each one investigates on one field. One of them is Ecology. Ecology is defined by following terms: The study of interactions between organisms and the environment or the study of construction and quality of biological phenomena occurring in nature. The issues which are represented in ecology are Production and analysis of ecosystems, the flow of material and energy in ecosystems, Biogeochemical cycles, Ecological pyramidal, Food chains, Type of habitats, Environmental pollution. In all kinds of sciences, Ecology is the one and only subject that is worry about consequences of sciences, technology and excessive interference of knowledge and human. Some researchers have called Ecology as "Science of anti-science" because it tries to play a role as a brake of science machine and power of the man. The first principle of ecology is that each of organisms

has a permanent relationship with the other of environmental elements. Ecosystem means any situation in that there exists an active relationship between organisms and ecosystem includes two natures: 1-life in integrity, 2- an environment with life in it. In ecosystem, organisms have interrelated by food chain. The sun's energy travels from up to down by photosynthesis process of chain of life as: 1- planets, 2-organisms, 3-mammals. So we look for cycle of phenomena, the harmful pollution.

As we know, for precision control of pollution, first, we must turn to sources. So the source of pollution identification is very important. The changes of pollution can be studied locally by nanotechnology. Usually it is late, when we know what a harmful activities we have done to the environment. Nanotechnology has made it possible that such materials are consume or effectively reduce entry of contaminants that is the result of human activities in an environment. The result of movement according to a program to some industries will be reduce the damage of natures. So it is possible by nanotechnology helping. Suspended Nano-particles in the air have greatest impact on human health. Such as mineral particles in the water and nanoparticle in the air that come out from fire and combustion .however, many of them have a human resource.

About 60% of nanoparticle in the environment is from road transportation and 27% from other Combustion processes (for example: plants activities).The floating nanoparticle in the air has the greatest impact on human health. It is known that increasing level of very small floating particle in the air with diameter less than 10 micrometers.(we note that each micrometer is equal to 1000_nm)can be attributed to the increasing heart and respiratory diseases. The growing evidence suggests that Nano-particles in this range can penetrate in the lungs and cause inflammation and spreading in other part of body. We need two things to control nano-particles: 1-reduce or prevent releasing of Nano-particles from combustion, 2-accurate identification of environmental pollutants. Reducing of Nano-particle can be achieved by using filters with nanometers holes for combustion process. For example, Nano sized particles of oxide of Ce are increasing efficiency which reduce the amount of pollution in diesel engines. Identify pollutants

also can will be achieve by a number of analytical techniques that already exists and still using and Nano scientists are more developing of them. These methods are evaluating size, shape

S. Khorami is with the Tehran Markaz Azad University. Iran (corresponding author to provide phone: +982144403611; e-mail: sepehr.khorami@gmail.com).

S Khorami, is with the Tehran Markaz Azad University. Iran (e-mail: sahand.khorami@gmail.com.).

A. safaei is with the Amirkabir University. Iran. (e-mail: alirezasafaei@yahoo.com

and chemical reactivity of particles (all aspects that show activity of Nano-particles).[2]

Contaminated environment gets an idea to everyone that how we can provide a healthy environment. With certain changes in the industry by Nanotechnology helping, can be made indigestible material in context of nature, or it can be converted in to other commodities. Poisonous gases are removed by the development of fuel cells and renewable energies will be replaced with fossils fuels. The deliberate actions will be done before a big risk happen if the care of environment will be done carefully to deal with it. So finally, the nanotechnology can be used if the risk will pass the usually ways .so will be reduce environmental damage. In the future, new energy will be help to nanotechnology efficiency. For example, solar cells, wind, ocean wave, and geothermal energy may be producing more energy by using enhanced materials. By advances in battery and hydrogen fuel cell, energy is used more efficiently. Nanotech sensor will not allow identifying and prosecuting the effects of human activities on the environments is too fast.

Nanotechnology is also helping us in refining existing contamination and proper use of our disposal resources. Leakage of noxious gases is one of the hazards in industrial life every day. Unfortunately, warning equipment in the industry is often detected of these leakages of gases too late. This type of nanotube sensors are made of a single layer with an about one nanometer thickness. And can absorb the molecules of toxic gases. They are also able to identify a small number of molecules of noxious gases in the environment. Researchers have claimed that these sensors will be used to detect of war biochemical gases, air pollutants and organic molecules in space.

The industrial revolution creation led to production pollution extremely. These pollutants have a serious impact on the planet. Scientists are divided earth in to 9 sections as follows: 1-Climate changes, 2-rate of biodiversity lost, 3-the nitrogen and phosphorus interface cycles, 4- the reduction of ozone layer, 5-Ocean acidification, 6-freshwater usage, 7-chemical pollution, 8-how to use the land.

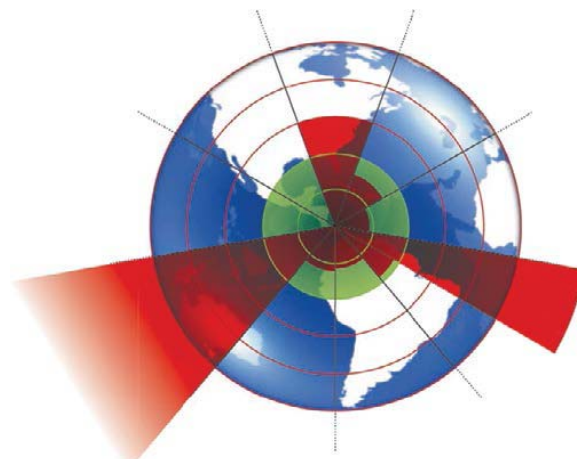


Fig 1-a view of 9 divisions of earth

As it shown in Fig 1, only the central part of the green symbol of a healthy environment and the rest of it, triangular gap that represents the current situation mentioned.

1-Toxic gases absorbing: leakage of noxious gases is one of the hazards in every day in industrial life. Unfortunately, the warning equipments in industry is often too late to be able to detected of these gases leak. These nanotube sensors are made of a single layer with an about one nanometer thickness and can absorb the molecules of toxic gases. They are also able to identify a small number of the molecules of noxious gases in the environment. The researchers claim that these sensors will be used for detection of war biochemical gases, air pollution and organic molecules in space.

2-Water Photo catalytic treatment: photo catalytic processes, low pressure mercury lamps have been used. Due to the content of mercury, these lamps are considered an environment hazard. In this regard, the LED lamps, Due to the usage of technology of semiconductor to light production, are lacking of mercury proportional. However, the usage of these lamps requires make a new catalytic and proportion of them for operate in the low intensity light.



Fig 2-a view of LED

These Nano catalytic can remove 96.3% of the amount of Diaz ton in the water. Clearly, LED lamp by usage much lower of energy in treatment system, is the causing to eth conservation of energy and the prevention of environment pollution.

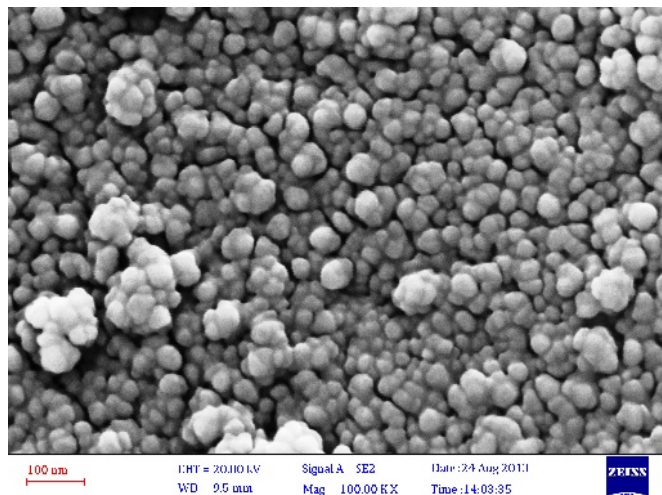


Fig 3-a view of Nano catalytic

The Nano catalytic is made of composite materials based on titanium dioxide that the average of pore diameter about of 17 nm and 6nm of crystal's diameter has been reported. And so, the increasing concentration of nan catalyst is involved with increasing the rate of contaminant degradation. So that, by increasing concentration of 25 of 300 milligrams per liter, filtering rates increased from 48 to 96 percent.

3-Nano filters: Water is the main component in the life of Organisms. But the human pollution is released into water as the result of human intervention in the environment and the human has forced to use these resources to ensure their purity. The use of Nano filtrations cause to pass the large molecules, usually. And compare with other methods are able to spend less energy and waters of wells to good treatment of the surface water. This process can divide a variety of bacteria, viruses, pesticides pollution with organic source. By considering that none of Nano filtration processes use chemicals materials to softening. So there is less negative environmental impact than conventional chemical methods.

The Nano filters that are using for water or air treatment, can also isolate bacterial and viral materials, and destroyed completely them behind the filtrate wall. This ability has used in the air filters that exactly doing this job. These filters have used the covered energy from nano particles such as zinc and silver, which have coated on filter, and by treat of each live structure of it will be destroy. One of the most important tools of disease prevention, other than providing disinfected surfaces, is the stay away from exposure to disease-causing microbes. It would like to the air treatment by fluids that

patients are placed at risk during the treatment. Most of viruses can pass through the filters, because these are smaller that the pores of the filter. Therefore these filters will remain unused. The Nano filters don't pass through the viruses with nano dimensions pores. The apply of activate compounds such as the nano particles of silver or the titanium dioxide and the source of UV light can increase the effect by destroying viruses, bacteria and trapped fungi. Such as these systems were used to against the SARS, and they used Patients for prevent of the spread of viruses. The filter has more ability to remove the particles, if the filter's pores have smallest size and more porosity.[4]

4-Nano Composite of wood-plastic: In a conducted study which the pistachio powder have be used the as a heavy filler polyethylene matrix. So the effects of nanotubes(Cloisite 20A) and light stabilizers on the tensile properties, impact, color and the resistance to weathering of wood's composites-molded plastic have been examined.

Efficient usage of agriculture's waste and turn it into a product with desirable engineering properties and prevent of cutting of trees are one of the achievements of this project. On the other hand, by using the nano_tubes in the fabrication of the composite, the amount of water absorption have been reduced by it and tensile of modulus have increased.

On the other hand, the presence of amine of light stabilizers(HALS) and titanium dioxide causes that amount of the missing of the color produce will reduced by over the time and compare with control subjects(without stabilizers) for achieve an acceptable level.

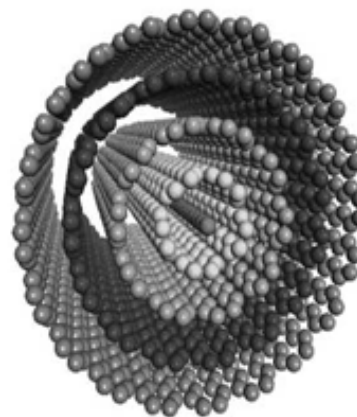


Fig 4-a view of Nanotubes

5-Nanotubes for absorbing carbon of toxic gases:

By according the extensive research, the nanotubes is appropriate tools for absorbing pollution of toxic such as dioxins and other pollutants in the outlet gases from chimneys of ovens for waste burner. The toxic of dioxins is also byproduct of many industrial processes that also has great

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abundant stable cause's long-term contamination of air, soil, water and finally the chain of food for organisms. Some of dioxin is carcinogen and many of them are cause of disturbances in the human immune system. Although, the many countries have drastically controlled this material in recent years, but the environmental risks are still considered threatening. Although carbons nanotubes (Figure 4) are appropriate tools for absorption toxic pollutions such as dioxin, but the price is too high. Ongoing research for low-cost production of carbon nanotube continues. In addition, the using of carbon nanotubes in display of computer helps to reduce the usage of heavy metals and thereby reducing the damage of environment.

CONCLUSION:

Having a healthy environment for each person has special significance .The principle protection of environment that rising from science and experience of science practitioners in around the word .one of the important ways is usage of nanotechnology to preserve the environment for present generation and future generations. The achievement of healthy environment has been cause to cleaning life for human .One of the nanotechnology, is making a healthy drinking by catalyst. Nano tubes have important roles for the absorption of toxic gases , that it is efficient for environment improvement for toxic gas absorption from cars and factories.

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The physiological investigation of the cinnamon-sweet root-ginger-fennel effect with honey in NMRT adult mouse

H.Akhavan*, R.Narymany

Abstract:

The obesity is the fundamental health problem in the world which new ways are needed to deal with it. In the study of obesity prevention, the animal models is a useful tool. In this study, the adult male NMRT mice with base weight of 23 ± 4 g with a high-fat and regular diet with combinations of four plants named the cinnamon-sweet root-ginger-fennel with honey for six weeks as a care group are compared with the control group. The mice weight measured once a week. After six weeks the mice became unconscious and their blood samples collected. In the end of the sixth week, the body weight of care group with fat diet with herbal medicine were reduced 15% and 35% respectively, comparing with the body weight of the control group (which received a normal diet without the herbal drug). The abdominal fat of control group were twice more than the care group with normal diet and herbal medicine and the relative accumulation of abdominal fat is also determined by using color. Among the investigated biochemical factors (cholesterol, triglyceride, HDL and LDL), only the triglyceride levels of control group is increased and in two care groups had significant decrease. Overall, the herbal medicine which consist of four plants, the cinnamon-sweet root-ginger-fennel, with consumed honey can be considered as a stimulus to weight loss in mentioned race within six weeks.

Keywords: thinness- medical plants- mice- cholesterol- triglyceride.

Introduction:

Obesity is defined as the accumulation of the fat in certain body areas. This is due to imbalance between the input and output energy of the body. One of the key priorities in the developed and developing countries is overweight control in the population. The overweight and obesity are estimated by using body mass index (BMI) which yield by dividing weight in kilograms to square of height in meters. Then people are grouped as follows: the BMI 20-25 is known as normal weight 25-30 is known as overweight and equal or greater than 30 represents symptom of the obesity. The other important parameter of obesity is waist size that specifies abdominal fat and diabetes type II is predictable by its increment. The overweight is the sixth diseases related to other ones in the world [1]. According to Hippocrates, Obesity is a medical difference which leads to the incidence of many diseases simultaneously. Many epidemiology documents confirm it. The obesity increases the probability of some cancers such as

prostate, breast and the endometrial problems of muscular skeleton may be created according to functional restriction as a result of obesity. The overweight women are disposed to primary and secondary infertility and menstrual irregularities. The studies show that the infants of mothers with obesity that their BMI before pregnancy is less than 30, is more than 2–4/3 in compare with infant mothers that their BMI is less than 20, the risk of dying before birth is probable [2]. So the obesity as a chronic disease highlights the essence of treatment. To further investigation in obesity and experiment field of medicine composition, the laboratory models are used. In this way, it is common to utilize small laboratory mice, named rat, and the rabbit use of large animals and varied food diet is expensive [1]. All synthetic medicine which is used to treat or prevent obesity has side effects. Due to the side effects and the high cost of them, finding the effective compounds is increased [3]. In recent decades, more studies suggested on the treatment specifications to improve different diseases. Therefore, the current research is a simple method using verbal medicines as the cinnamon-sweet root-ginger-fennel with honey to improve thinness or to prevent obesity.

Methods and Materials:

A-beasts and their maintenance conditions

NMRT mice with base weight of 23 ± 4 g were purchased from the School of Medical Sciences, Tabriz University. After transferring to the laboratory, in order to adapt to the new environment, there was unrestricted access to ordinary food and water for a week. The room temperature for the animals was 23 ± 2 degrees during the study period, the relative humidity was 55-60% and the light-dark cycle was 12 hours. In the end of the first week, the rats were weighed and randomly divided into three groups: a control group and two care groups. (Each group was consisted of 6 rats). In the control group, the access to food was typical unrestricted and in the first care group, they had a normal diet with a mixture of 4 plants (the cinnamon-sweet root-ginger-fennel with honey)

and in second one, there was a high-fat diet plus a combination of 4 plants (the cinnamon-sweet root-ginger-fennel with honey). The mice weight was measured every week, and recorded[4].

B-The diet:

During six weeks, the mice in control group had access to standard water and food from Pars animal feed company. High-fat food were bought from Pars animal feed company which included: 1% cholesterol powder and 1% corn oil (100% pure).

C- Preparation of herbal medicines:

To prepare an effective herbal compound to prevent obesity, the plants were used which have application in traditional medicine. Therefore, the cinnamon bark, sweet root, ginger root and fennel fruit with natural honey is used to prepare a compound by specific weight and the care group fed further more diet. So, vegetable samples were completely crushed. Then, 5 g of cinnamon, 10 grams of sweet root, 5 grams of ginger, 10 grams fennel were mixed. After that, the 15 grams of natural honey is also added to the mix. The collection became doughy with water, then it dried under the sun light and the dried sample, in the form of a powder, were added to diet of mice in care group.

D-estimating the weight of body:

The body weight of the care and control groups were measured every week. The percentage of the average body weight loss was calculated in each group at the end of the sixth week by using the following formula [1],[2]. (Final body weight / basis body weight (gr) 100 / basis body weight)

Biochemical analysis:

After 12 hours of unfasten, the blood of mice which were under light unconsciousness by using diethyl ether were collected from their heart. Then blood samples were at environmental temperature and after half-hour they were put in the centrifuges with 2500 round for 5 min to remove serum.

Then cholesterol, triglycerides, THDL and LDL were measured by Priner analyzer and commercial kits[3].

Histological evaluation:

After dissecting the animal, the liver and the kidney were removed and stored in Bouin solution. After the passage steps, tissues were embedded in paraffin and sectioned by using a microtome to thickness of 7 microns. After that, the Hematoxylin and eosin coloring was done[6]. So the abdominal fat was weighted in each three group.

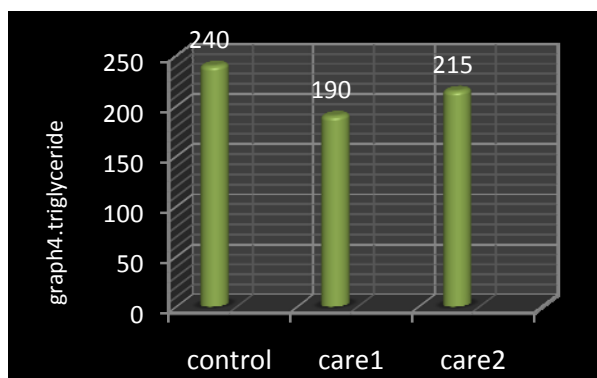
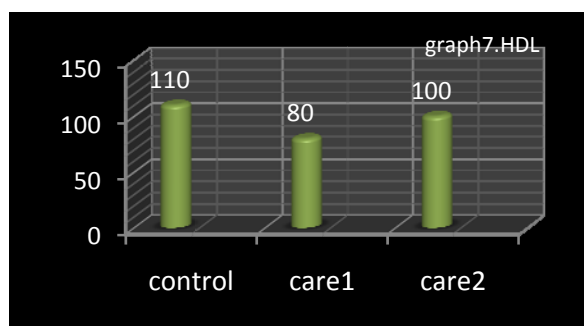
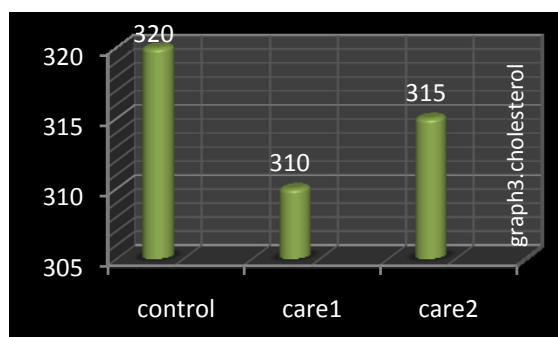
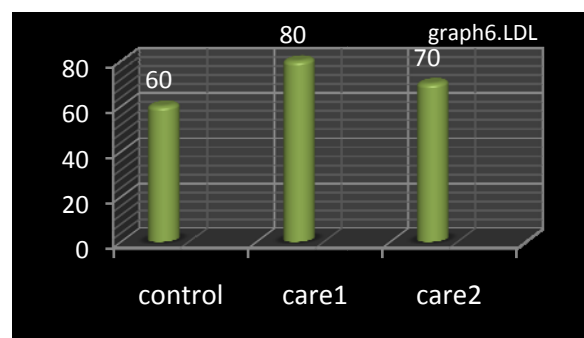
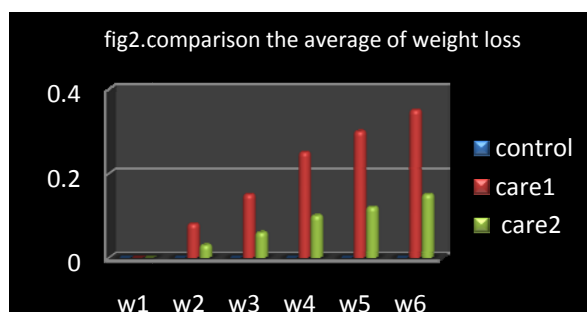
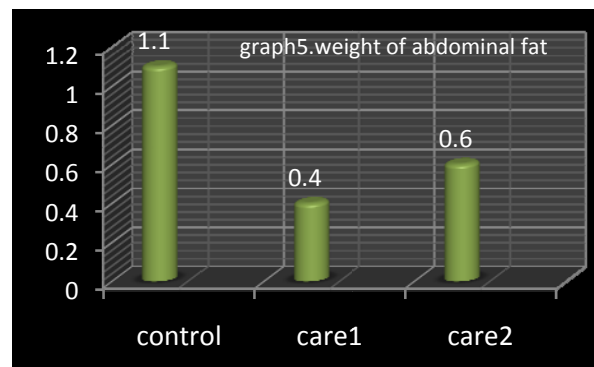
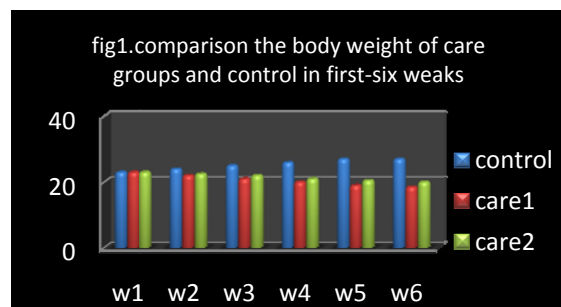
Information Analyze:

The results were given as initial data to the computer. Then, the averages compared by consideration of the standard deviation (SD) and ($0.05 > P$). And statistical tests (a) was done and the graphs were plotted in EXCEL program.

Results:

Comparison of body weight

It is shown in fig.1 that the body weight of care groups in first week of experiment has decreased and it was significant in comparison with control group. The biochemical analysis of cholesterol, triglyceride, LDL and HDL compared between the care and control groups after six weeks (graphs 3 to 7). The difference of weight loss among three groups is increased in second week and this difference is maintained with same form to end of study. The average of weight loss percentage is estimated 15% and 35% respectively in the care group with high fat diet beside the verbal medicine and the care group with normal diet (Figure 2). The cholesterol in the three groups were similar (Table 3) while LDL is increasing (Figure 6) and HDL is decreasing (Figure 7) in the care group. But these differences were not statistically significant and the triglyceride measurement is showed meaningful decrease in the care group (Figure 4). The comparison between the parameters of kidney and liver include significant changes among the control and care groups. The weight of abdominal fat is achieved. This factor is decreased in the care group, that is, the weight of abdominal fat in the care group with ordinary diet and verbal medicines is approximately half of the control group (fig.5).



Discussion and Conclusion

In this study, among the biochemical measured parameters, only the serum triglyceride levels in blood is decreased in the care group in comparison with the control group. The storage of triglyceride in the fat cells, is their main function that such herbal medicine, consisting four elements with honey, can reduce triglyceride in cells. But there is no meaningful effect on decreasing of blood serum cholesterol.

The used model was laboratory small mice which the maintenance and work are easier and less expensive than other experimental models. The body weight reducing was acceptable in six weeks.

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Curriculum Content Analysis of High School Biology, Chemistry and Geography Textbooks Based on Environmental literacy Approach in 2013- 2014 school Year

Mahboubeh Soleimanpour Omran

Abstract— This research was conducted with the aim of studying the current condition of textbooks based on the amount of attention paid to components of Environmental literacy including knowledge, skill and environmental attitude. Research method was content analysis using Shannon's entropy technique and page analysis unit (text, questions, exercises, illustrations) was High School textbooks. Data collection tool was content analysis checklist, validity of which has been confirmed by environmental experts and curriculum designers. Results of data analysis indicated that more attention has been paid to environmental knowledge rather than environmental attitude or environmental skill and textbooks do not address environmental components equally. Based on the findings of this research, revising the curriculum content in high school curricula with regard to attention to components and indexes of Environmental literacy seems to be necessary.

Keywords— Content analysis, Curriculum, Environmental literacy.

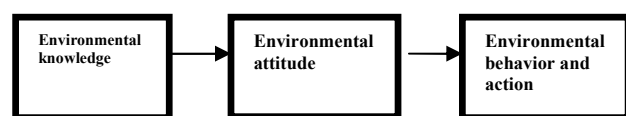
I. INTRODUCTION

ONE of the significant contemporary issues is the environmental crisis which is the characteristic of twenty first century societies (Mohammadi Ashenani & et al., 2008) because the majority of environmental problems are the result of human activities. Through education, we can have a society with environmental education. Taking into consideration Iran's cultural background in preserving the environment and according to Article 50 of the Islamic Republic of Iran constitution which considers "preserving the environment as a public responsibility" (Constitution of Iran, 2003) are the most effective subjects and the first priority for this kind of education.

Environment is a complex network which links various life forms and in which everything is harmonious and compatible (Boutkin & Claire, 2009). Environmental education is part of citizenship education. Educating a democratic citizen covers a wide spectrum of knowledge, skills and course subjects. Clark

and Halden (2002) believe that a citizenship curriculum should provide opportunities for environmental education (Yarmohammadian, 2008). Healthy environment provides the grounds for sustainable development. World Commission on Environment and Development considers a development sustainable provided that it meets the needs of the present generation without damaging the capabilities of the future generations in fulfilling their needs (Turner & et al, 1995). Since public awareness leads to sustainable changes, environmental education as the third aspect of sustainable development, has been put on the countries agenda (Mirdamadi & et al. , 2008) and naming 2005- 2014 as the decade of "Education for Sustainable Development" by the United Nations Organization was in line with this objective. so that they may improve their understanding and skills in these areas and in addition to sound judgment and sense of responsibility, take appropriate measures in this respect (Alvarez & et al. , 2010). But the results of the studies indicates the younger generation's low grade in this regard, and this while they will be the future voters and taxpayers and should be persuaded about environmental hazards so that they may be prepared for paying the price and investing in the area of environment (Jurin & et al., 2010). According to Tbilisi summit environmental education charter (1977), environmental education comprises of: 1- environmental knowledge and awareness: awareness of the environment and its issues as a whole, developing the ability to understand and recognize and to use this ability in various areas; 2- Acquiring a set of values and sensitivities regarding the environment and having the motivation to participate in preserving and improving it; 3- Skills: Acquiring the required skills for recognition and studying the issues; 4- Participation in solving environmental problems and issues (Ramsey & et al., 1992). In this regard, Marcinowski and Rehring proposed the model of environmental education (Graph 1).

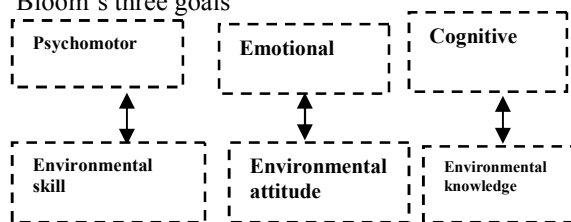
Graph 1- Marcinowski and Rehring's environmental literacy(1995)



Source: Shobeiri and Abdullahi (2010)

However, besides gaining knowledge, students need to gain environmental knowledge in the form of empirical environmental ethics, introduction to cultural concepts and environmental values, shift of values and their attitude towards them, participation in preservation of the environment, turning into a committed and responsible citizen, learning to use resources properly, adopting an environmentally compatible lifestyle, proper decision-making for environmental problems and preventing new problems, sensitivity to incidents and various decisions that affect the environment, gaining the ability to recognize and analyze environmental issues and devising new methods for solving its problems (SoleimanPour Omran & et al., 2013). Researches show that in spite of high level of environmental knowledge, environmental behavior is weak, especially when we are faced with costs or giving priority to individuals' welfare (Shobeiri & Abdullahi, 2009). It is because environmental education should include three levels of perception (knowledge and understanding), emotion (evaluation and internalization) and activity (action) (Piry, & Ghasemi, 2009). Elements of environmental education are related to categorization of Benjamin Bloom's (1956) educational goals in which educational goals are divided into three main levels. Bloom's three levels include the cognitive, psychomotor and emotional levels (Graph 2): A- The aspect of environmental cognition and knowledge: based on Bloom's categorization, the area of cognitive learning includes six levels of knowledge, comprehension, application, analysis, synthesis and evaluation [48]. Results of the study by Ghazab Oghloo and Ekwit (2002) showed that knowledge level has the highest effect on environmental (Ferdosi & et al., 2008). Environmental knowledge determines the nature of individuals' understanding of environmental performance and their interaction with the environment behavior (sydabdullah & et al., 2011) B- The aspect of value and attitude includes ethics, aesthetics and emotions and has been organized based on internalization principle and is comprised of the stages of perception, reaction, evaluation, organization and manifestation (Piry, & Ghasemi, 2009). Environmental preservation attitude includes the software dimension along the hardware and technical dimension, that is, the environmental knowledge and awareness. The aim is to value and respect the environment (Hungerford & et al, 1980) C- The aspect of skill and action refers to general skills regarding environment and includes the skills of communication, study, problem solving, individual and social skills and information technology (Palmer & et al., 2002).

Graph 2- Three areas of environmental education and Bloom's three goals



Curriculum content which includes the organized knowledge, methods and concepts of a course subject (Mohammadi Mehr and Fathi Vajargah, 2010) is formally transferred through textbooks and raises awareness and changes the attitude of the learners towards the environment and promotes a lifestyle compatible with nature in them; therefore, textbooks require principled curriculum planning (Alvarez and Vega Marquette, 2001). Domestic researches show that in the Iranian education system curriculum little attention has been paid to environmental education. In a study entitled "Citizenship Education and Environmental Education", Taghiyeh et al (2011) showed that in vocational training curriculum only environmental knowledge has been taken into consideration and environmental attitude has been neglected. In a study entitled "A Study of Elements of Nature in Second Grade of Primary School Persian Textbook" Amal Saleh et al. (2010) showed that with regard to syntactic-lexical construction, elements of nature in children's textbook have been represented passively, and on the whole, no targeted effort has been made to build culture and promote new viewpoints in relation to nature. In a study entitled "Curriculum Content Analysis of Social Education Textbooks in Iranian Primary Schools with Regard to Attention to Environmental Issues", Ghazavi et al (2010) showed that in primary school social education textbooks, environmental issues have been neglected. In a study entitled "Assessment and Determining Educational Priorities of High School Students with Regard to Environment and Sustainable Development", Haj Hosseini et al (2010) showed that high school students consider the current condition of environmental education to be insufficient and do not think that it meets the requirements of their age group. In a study entitled "A Study of the Environmental Attitude and Awareness of Iranian and Indian High School Students", Shobeiri et al (2006) concluded that Iranian students are in need of higher environmental awareness and the curriculum and textbooks do not provide them with sufficient awareness and knowledge (Shobeiri et al, 2006). In a study entitled "A Study of Middle School Curriculum with Emphasis on Environmental Education", Dibae and Lahijian (2009) showed that textbooks provide sufficient environmental knowledge but not sufficient environmental attitude or skill (Dibae and Lahijian, 2009). In a study entitled "A Study of Presentation of Environmental Issues in Textbooks", Yaghoubi (2003) showed that the most conspicuous characteristic of textbooks

is improving the memory in the area of knowledge. In a study entitled "Curriculum Content Analysis of Primary School Textbooks Based on Components of Global Education", Salehi et al (2009) analyzed primary school textbooks in respect to global education components including environmental education and showed that this subject has not been addressed sufficiently. Shayan (2004) believes that environmental education is more serious in high schools, which is because of the special characteristics of this age group and considers high school general geography course to be the one which pays the most serious attention to environmental education- especially the second grade geography textbook. In a study entitled "The Status of Environmental Ethics in Iranian Primary Schools Curriculum", Bayat et al (2013) showed that in these textbooks, the maximum attention is paid to environmental knowledge and the minimum attention to environmental skill. In a study entitled "Globalization and Global Citizen Education", Farmihani Farahani (2005) has regarded the environment as one of the basic issues in citizenship education and has analyzed the effects of globalization on the environmental citizen in regard to environmental knowledge, skill and attitude. It can be concluded from the abovementioned studies that, generally, environmental education within the curriculum is scarce, incoherent and merely in the form of environmental information. Traditional curriculums cannot meet today's environmental needs and in addition to growth of environmental awareness, students need to acquire new knowledge, attitude and skill and make a change in their environmental behavior. These indexes, which have been obtained based on domestic and foreign researches on this subject, comprise the basic principles of the present research. The present research seeks to determine how aligned high school textbooks are with the specified objectives and presents environmental components so that in this way appropriate grounds are provided for revising the textbooks. To this end, the current research seeks to answer the following questions:

To what extent do high school biology, geography and chemistry textbook contents pay attention to environmental knowledge?

To what extent do high school biology, geography and chemistry textbook contents pay attention to environmental skill?

To what extent do high school biology, geography and chemistry textbook contents pay attention to environmental attitude?

II. METHODS

This research is descriptive and of survey type and seeks to describe the current condition of high school textbooks in regard to environmental education. Research method is content analysis using Shannon's entropy technique. The statistical population comprised of all the newly compiled second grade high school textbooks of the Iranian education system which have been compiled and published by the Office

of Planning and Compiling Textbooks for the 2013- 2014 school year and are going to be used for the first time at schools throughout Iran in October 2013, out of which three textbooks including second grade high school geography, biology and laboratory and chemistry textbooks were selected using targeted sampling method. Geography is related to place and environment and biology and chemistry are related to sciences and provide a fertile ground for environmental education (Gifford, 1983). Research tool was content analysis form which was developed using researcher-made questionnaire. After studying the theoretical principles and results of previous researches, environmental education components were extracted and categorized, which include 5 major and 50 minor components including: A- Knowledge comprising of four components: 1- water, soil, air; 2- plants, animals and biodiversity; 3- consumption, waste and pollution; 4- man and environment. B- Environmental attitude. C- Environmental skill. Within the framework of Marsinowski and Rehiring's (1995) environmental education, these components were categorized into three aspects of environmental knowledge, attitude and skill. The importance of each "option" in relation to the major components is questioned using Five-point Likert scale (ranging from very little participation" to very much). The questionnaire was validated using Morgan table and two different populations of curriculum and environmental experts were consulted and totally 46 questionnaires were collected. In order to conduct an initial validation of the theoretical framework, percentage and frequency of experts' opinions were calculated and in order to study reliability of the framework, internal consistency of the components was calculated using Cronbach's alpha. Content analysis unit included 1- text, 2- illustrations, graphs and shapes 3- questions, activities and assignments. Then environmental components, which had been classified into the three categories of knowledge, attitude and skill, were analyzed within textbook contents. Unit of analysis of text, questions and activities was page. To process the data, Shannon's entropy technique, which is adapted from systems theory, was employed. In this method, first, the message is organized based on major and minor components in the form of calculated frequency and according to frequency table and the data are normalized. Then, information load of each category is calculated and at the end, using the information load of categories, significance coefficient of each category is obtained. Entropy indicates the level of uncertainty of message content (Alvani, 2009) and includes the following phases respectively:

First phase: frequency matrix of the frequency table must be normalized. To this end, the following equation is used:

$$P_{ij} = \frac{F_{ij}}{\sum_{i=1}^m F_{ij}} \quad (i=1,2,3,\dots,m, j=1,2,\dots,n) \quad (1)$$

j= category number, i= respondent's number,
F= category frequency, P= normalized frequency
matrix, m= number of respondents

Second phase: information load of each category is calculated and is placed in their respective columns. To this end, the following equation is used:

$$E_j = -K \sum_{i=1}^m [P_{ij} L_n P_{ij}] \quad (j=1,2,n) \quad K = \frac{1}{L_n m} \quad (2)$$

$P = \text{normalized matrix, } J = (1, 2, 3, \dots, n) \quad L_n =$

Logarithm $j = \text{category number } i = \text{respondent's number}$
 $m = \text{number of respondents}$

Third phase: using information load of the categories ($i = 1, 2, 3, \dots, n$), significance coefficient of each category is calculated and each category which has a higher information load, has a higher significance level (W_j). To calculate this coefficient, the following equation is used:

$$W_j = \frac{E_j}{\sum_{j=1}^n E_j} \quad (3)$$

$n = \text{number, } E_j = \text{number of categories, } W_j = \text{information load of each category, } j = \text{significance level of each category}$

It is noteworthy that in calculating E_j , P_{ij} values which equal zero have been replaced by the infinitesimal number 0.00001 in order to avoid errors and infinite results in mathematical calculations. But j is an index which determines the significance coefficient of each category in a message with regard to the respondents' figure. On the other hand, based on graph w , categories obtained from the message are also ranked. The focus of this research is on the third phase of content analysis which is processing the data collected from the message. After encoding the message and categorizing it, obtained information is analyzed. At first, the message is counted in the form of frequency and in terms of categories and in proportion to each respondent. Based on the data from the frequency table, the following steps are taken:

First, the sum total of obtained frequencies for each component of the studied textbooks as well as the data normalized based on the first phase of Shannon's entropy technique were presented in Table 1. Then, based on the second and third phases of Shannon's entropy technique, level of uncertainty and significance coefficients of the data obtained from the aforementioned tables were calculated in Table 2 and eventually, frequency distribution of the research components and the results obtained from them using Shannon's entropy technique were presented in Table 3 in order to determine which components receive the highest amount of attention.

The highest frequencies in environmental knowledge component were those of forest destruction and ... with frequency of 34 and its significance coefficient and limitation of water resources and indiscriminate use of water with frequency of 25. And the lowest frequencies were those of the two indexes of role of students and women in preservation of the environment and awareness of the rights of other creatures,

each with frequency of 0, in a way that it could be stated that these two indexes have been completely ignored. The highest frequency in environmental attitude component was that of awareness and sensitivity to environmental issues with frequency of 44 and the lowest frequency was that of observing the rights of nature and creatures and

Within the rules with frequency of 1, the highest frequencies in environmental skill component were those of the index of environmental observation, evaluation and interpretation with frequency of 31 and the index of research and skill for acquiring knowledge and information about preventing pollution and preserving the environment with frequency of 29. And the lowest attention was paid to the indexes of assessing technologies compatible with nature and using information technology for providing information about social and cultural environmental issues, each with frequency of 0. Also there is a considerable difference in level of attention to the environmental components in texts, illustrations, questions and assignments. Out of the calculated frequencies of texts, illustrations, questions and assignments, frequency for second grade high school biology textbook was 6, for chemistry textbook 5, and for geography textbook 502. For environmental knowledge component, there were 144 texts, 91 illustrations and 35 questions and assignments which indicate that for environmental knowledge component, texts are used more frequently than illustrations and questions. For environmental attitude component, there were 76 texts, 36 illustrations and 7 questions which indicate that for conveying environmental attitude, texts are used more frequently than illustrations. For environmental skill component, 11 texts, 46 questions and assignments and 23 illustrations have been used which indicate that, unlike the case of environmental knowledge and attitude, questions and then illustrations have been used to teach environmental skills.

Table 2 shows that sum total of obtained frequencies for each component of the studied textbooks shows that out of 506 units obtained from second grade high school geography, chemistry and biology textbooks, 137 address the components of water, soil and air, 55 units address the components of plants, animals and biodiversity, 56 units address the components of consumption, waste and pollution, 57 units address the components of man and environment. Meanwhile, 276 of them have been text paragraphs, 149 illustrations and 88 questions and assignments. In respect to environmental knowledge component, the highest frequencies are respectively those of subcomponents of water, soil and air with frequency of 137, man and environment with frequency of 57, consumption, waste and pollution with frequency of 56 and plants, animals and biodiversity with frequency of 55. On the whole, 305 units have been allocated to environmental knowledge, 88 to environmental skill and 119 to environmental attitude. This information shows that among the environmental education components, environmental knowledge, environmental attitude and environmental skill have respectively had the highest frequencies and frequency of environmental knowledge indexes is higher than those of

environmental attitude and skill indexes. Geography, biology and chemistry textbooks have respectively addressed the environmental components and geography textbook has had the highest frequencies for the three components of environmental knowledge, attitude and skill.

Table 3- significance coefficient of each category & level of uncertainty of environmental literacy

Table 3 shows that in the textbooks under study, the subcomponent of water, soil and air has the highest significance coefficient and information load among the environmental knowledge subcomponents and the lowest information load and significance coefficient is that of plants, animals and biodiversity. On the other hand, environmental knowledge component has the highest significance coefficient and the component of environmental skill has the lowest significance coefficient. Thus, in high school textbooks, environmental knowledge has been addressed more seriously than the components of environmental skill and attitude and environmental skill has the lowest significance coefficient among the components. On the other hand, significance coefficient of the components of environmental skill and attitude are close to each other which indicates that in textbooks less attention has been paid to these two components.

RESEARCH FINDINGS

Research findings show that frequencies have been distributed among the three components of environmental knowledge, skill and attitude. Out of 513 environmental components counted in the content of geography, biology and chemistry textbooks, 305 units have been allocated to environmental knowledge, 119 units to environmental attitude and 88 units to environmental skill which indicates that environmental education components in the content of textbooks do not enjoy a normal distribution in a way that frequency of environmental knowledge components is higher than those of the other two components. This shows the unbalanced distribution in regard to environmental knowledge, skill and attitude in a way that some of the indexes have been completely neglected. Textbooks put more emphasis on providing knowledge and responsibility towards and care for the environment, intelligent and critical skills and active participation in this area have not been addressed as efficiently

and the textbooks merely present a set of information. Among the textbooks under study, geography textbook pays the highest attention to environmental issues which can be assessed as really satisfactory. Yet contrary to the expectations about biology and chemistry textbooks which have a high potential for environmental educations, environmental education has been neglected in these books. The significance of such negligence is due to the fact that our education system is textbook-based and students at this stage have higher interest and readiness for more profound, serious and practical education. Besides, since as citizens, they will soon participate in the process of management and decision-making for the future of the country and will enter the workplace, they are in need of environmentally compatible education. On the other hand, as their mental capabilities for understanding environmental issues increases, high school students are in need of a more profound and practical environmental approach which suits their abstract thinking. Therefore, taking into consideration the findings of this research, it is recommended that the issues of environmental skill and attitude be addressed more efficiently. Excessive attention should not be paid to some repetitive issues such as water consumption, etc. which students at this age are already familiar with and the time should instead be spent on newer and more serious environmental issues which have somehow been neglected. More attention should be paid to illustrations and activities rather than texts, because they generate interest and lead to active and effective learning. Furthermore, within the teacher training course curriculum, components of environmental education should also be taken into consideration. Environmental education requires simultaneous consideration of the three components of knowledge, value and attitude in environmental education. On the other hand, close relationship with other course subjects is necessary so that environmental education may be addressed as efficiently as other courses. Environmental education as an interdisciplinary field requires integration. Incorporating environmental concepts into the courses will lead to easier and more effective learning. Yet, lack of consideration for environmental education and accumulation of environmental concepts in a single course will hinder the achievement of the objectives of environmental education.

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Table 1: frequency Distribution environmental literacy in Geography, biology and chemistry textbooks in high school

total frequencies	biology frequency			Chemistry frequency			Geography frequency			category
	Image	Question	Text	Image	Question	Text	Image	Question	Text	
305	0	0	0	1	0	2	90	35	177	knowledge
121	0	0	0	1	0	1	35	7	6	attitude
80	1	2	2	0	0	1	22	44	8	skill
506	1	2	3	1	0	4	146	86	270	total

Table 2: frequency Distribution & data normalized of environmental literacy in Geography, biology and chemistry textbooks in high school

environmental skill		environmental attitude		frequency Distribution & data normalized of environmental knowledge								category
data normalized	frequency	data normalized	frequency	pollution man and environment		consumption, waste and		plants, animals and biodiversity;		water, soil and air		Resources
				data normalized	frequency	data normalized	frequency	data normalized	frequency	data normalized	frequency	
0/94	83	0/98	117	1	57	0/98	54	0/98	54	1	137	Geography,
	1	0/02	2	0	0	0/03	20/01	0		0	0	chemistry
0/05	4	0	0	0	0	0	0	0/02	1	0	0	biology and
0	88	0	119	0	57	0	56	0	55	0	137	total

Table 3- significance coefficient of each category & level of uncertainty of environmental literacy

environmental skill	environmental attitude	environmental knowledge				category
		pollution man and environment	consumption, waste and	plants, animals and biodiversity;	water, soil and air	Resources
0/229	0/089	2/096 10^{-4} *	0/122	0/089	10^{-4} 2/096*	information (Ej) load
0/432 5	0/168 1	10^{-4} 1959	0/2304	0/1681	10^{-4} 3/959*	significance (wj)coefficient

New and Sustainable methods and Approaches in protecting Natural Environment

Malihe Noorijangi^{*1}, Alireza Noorijangi²

Abstract— Natural environment refers to all environments in which life exists. It encompasses a set of external physical factors and living organisms that are interacting with each other and influence the growth, development and behavior of the organisms. Natural environment means combining different in science and includes set of biological and environmental factors in the form of natural environment and non-biological ones like physical and chemical factors that affect and are affected by the life of an individual or a species. Nowadays, this definition is related to human and his activities and the natural environment can be summarized as a set of natural factors of the Earth like air, water, atmosphere, rocks, and vegetation that have surrounded humans. In the 21st century, protecting the natural environment is known as one of the 8 goals of the century developments and considered as one of the 3 bases for sustainable development. In this regard, mechanisms like emphasis on idealistic approaches, i.e. diminishing realistic trend and resorting to critical modernistic approaches and International Environmental Law are thought to be among methods that guarantee the new approach of environment protection.

Keywords— Natural environment; idealism; critical modernism; approaches of International Environmental Law

I. INTRODUCTION

Due to the importance of natural environment in world's habitats like major water ecosystems, habitats located on the boundary between land and sea, major dry habitats, and major habitats of atmosphere and biosphere, environmental issues have not been paid significant attention in the process of decision making even in developed countries. More importantly, such issues in the plans of the developing countries do not have a certain position and sufficient relation with extensive economic and social programs. Moreover, other issues with more priority in these countries may marginalize environmental issues and concerns [1].

In critical approaches, environmental theories and related issues are worth evaluating. Critical approaches focus on assumptions like opportunity, criticism of the modernistic project, challenging realism paradigm, and development [2].

Opportunity assumption is critical approach is paid more attention by developed countries, which means that these countries are more concerned about global environmental problems like climate change, destruction of ozone layer, and issues such as the protection of whales and forests. These issues and problems are different in developing countries. Therefore, developing countries pay more attention to rural issues including desertification and soil erosion and urban problems like air pollution and air quality in cities [3].

Assumptions of criticism of criticism of the modernistic project and challenging realism paradigm have more overlap with issues of developed countries because modernistic project automatically leads to creation of realism as a theoretical approach in the structure of the international system. A review of modernism approach indicates that realism is a major trend in the structure of the international system and whenever it is referred to, power and war come to mind. It is vivid that components resulted from realism tradition, i.e. power and war, guarantee that natural environment will be polluted and impose the worst pollution in places where humans live. It is natural that components caused by realism tradition, i.e. power and war; bring about changes in the climate and other global destructive consequences [4].

The assumption of development is also related to developed countries because they consider the environmental policies as a chance to attain extra help and new forms of technology transfer whereas a group of countries consider them as a threat that decreases their economic prospects. The group of 77 consists of less developed countries always blame the North countries for being responsible for short-term actions against climate change. On the other hand, a large number of developed countries nowadays are looking for opportunities to attain a highly required technology called "Clean Development Mechanism"[5].

It is noteworthy that emergence of environmental concerns in the late 60s and 70s was reflected in academic environments and associated with critical theories on the modern society's illnesses. It goes without saying that critical theories may highly help environmental theories develop and grow although in practice there is little direct interaction between sustainable thoughts about the environmental effects of human community and the development of the international system. It should be noted that in the era of globalization, environmental theory cannot be separated from reflections of political order.

F. A. Author, Malihe Noorijangi., with Department of Environmental Science, Faculty of Environment and Energy, Science and Research Branch, Islamic Azad University, Tehran, Iran.

S. B. Author, Alireza Noorijangi., Ph.D student, Faculty of Veterinary Medicine, Zabol University, Zabol, Iran *Corresponding author: maliheh_noori89@yahoo.com

In this trend, all of the data collected by scholars of social studies and other fields should be utilized. Environmental issues should be considered as interior and/or exterior problems and paid attention to as a separate subject area in the International Law and one of the inevitable elements of theory [6].

II. NEW AND SUSTAINABLE METHODS AND APPROACHES IN PROTECTING NATURAL ENVIRONMENT

As was mentioned before, emphasis on idealistic approach diminishes the realistic trend and cause to resort to critical modernistic approaches and the approaches of the International Environmental Law can be among new methods to protect natural environment.

III. A. IDEALISTIC APPROACH (DIMINISHING THE REALISTIC TREND) AND ITS ROLE IN PROTECTING THE NATURAL ENVIRONMENT

Advent of new realism was accompanied with the revival of traditional notions. In this approach, countries are the major actors in the international policy and the governmental policy of the states is essentially anarchic. The contradiction in this system can ideally be utilized to decrease the possibility of war. However, war cannot be abolished and there is no solution for it. Resorting to the common interests of humans in survival and dependence on global government instead of integrated system of states are all in vain. Management of the system should be based on national interest of the governments and the best solution to maintain peace is power balance [7]. As was observed, the anarchic state of governmental system and its consequences have root in Hobbes's interpretation of the normal state of the international relations [4]. While emphasizing on power and national interests, realists believe that abolishing the instinct of power is merely a desire and that war breaks out in an environment that lacks central authority [8]. As was explained, the rational consequences of the components of realistic approach include power, national interests, survival, anarchic state of international system, and dominance of Hobbesian paradigm. Realistic approach leads to war that is vividly an important factor in destruction of the environmental concerns. When developed countries consider realistic approach as the cause of tension and power struggle and ultimately war, it is natural that they use liberalistic approaches that guarantee peace, protect human dignity, cause sustainable development, and protect natural environment [8].

IV. B. CRITICAL MODERNISTIC APPROACH IN DEVELOPED COUNTRIES AND ITS ROLE IN PROTECTING NATURAL ENVIRONMENT

One of the mechanisms of natural environment protection in developed countries is the critical modernistic approach. This approach is reactive to post-structuralistic and post-modernistic criticism which pays mutual attention to feministic and environmental concerns. Critical

postmodernism mistrusts any group of the elites including entrepreneurs, bureaucratic, scientific, intellectual, racial, geographic, and patriarchal ones and attempts in favor of needs and views of the oppressed including social movement of farmers, local organizations, women's organizations, labor and specifically environmental movements. In fact, the motto of critical modernism is that everything should be criticized, criticism should be converted into suggestion, suggestion is to be criticized, and at the same time something should be done. They believe that despite of criticizing modernism, much can be acquired from modern experience. While focusing on development issue, critical modernism provides some ideas to change its form. They include criticism of capitalist modernism, moral development, and new social and democratic movements. Through these ideas, it reaches an alternative development which is the key to the discussions of environmental concerns. This key is a mechanism and an approach to protect its [2]. Critical modernism takes a social stance in criticizing capitalist modernism that is an over-generalized discursive phenomenon and is derived from the modern world. According to critical modernism, capitalist modernism results from a patriarchal class society where a minority has access to means that decides the direction and the scope of development. Now, after almost two centuries, capitalism has brought convenience and at the same time imposed lots of damages to the natural environment. Therefore, the definition of development provided by modernism is associated with much contradiction such that it has practically turned into an anti-development trend [9].

V. C. THE APPROACH OF INTERNATIONAL ENVIRONMENTAL LAW AND ITS ROLE IN PROTECTING NATURAL ENVIRONMENT

International Environmental Law defines natural environment simply as all living or non-living organisms around human and all of them are in mutual interaction with each other. Depending on the importance they attribute to different environmental components, different countries use different definitions of natural environment [10].

International Environmental Law has focused on protection of natural environment since 1960s. Since then, revolution in environmental right took place in national and international law systems. In 1986, international organizations helped to start a new chapter in protection of natural environment. In that year, the UN and two other regional organizations "the Council of Europe" and "Organization of African Unity" adopted important international documents like "Declaration of War against Air Pollution" on March 8th, 1968, "European Charter of Water" on May 6th, 1968, and "the African Convention on Protection of the Nature and Natural Sources" on September 15th, 1968 [11]. However, the most important help that International Environmental Law has provided for protection of natural environment is related to the UN conference on human environment that is Stockholm Declaration, the World Charter for the Nature, and the Rio Declaration.

VI. 1. STOCKHOLM DECLARATION AND ITS ROLE IN PROTECTING NATURAL ENVIRONMENT

This conference was held under the United Nations General Assembly Resolution 2398 December 3rd, 1968 from June 5th to 16th. At this conference, very important documents were adopted. From among these documents, we can refer to the UN Declaration on natural environment containing an introduction, 26 agendas, and a practical plan that contained 109 recommendations. The Agenda 21 of Stockholm Declaration states that, "According to the UN Charter and principles of the International Law, governments have the right to exploit their natural sources according to their environmental policies and they should ensure that their activities are under their supervision and in accordance to their qualifications so that they do not damage the natural environment or regions that are beyond their national authority [11].

VII. 2. WORLD CHARTER FOR THE NATURE AND ITS ROLE IN PROTECTING NATURAL ENVIRONMENT

Ten years after the conference of Stockholm, the initial plan of the World Charter for the Nature that was developed and its final draft consisting of an introduction and 24 articles was adopted on October 28th, 1982 by the United Nations General Assembly. In the introduction, it is stated that human is a part of the nature and civilization is originated from it. Survival of economic, social, and political structures of a civilization and ultimately the peace depends on protection of natural environment. Therefore, any type of human factors that influence the nature should be guide and judged according to this Charter. In the second section, applications are discussed. Social and economic development should guarantee the protection of the nature. Wasting the natural sources should be fight against and the effects of human activities on the nature need to be measured. In the third section that is called implementation or execution, the principles adopted in the Charter are implemented into governments' law systems and are executed in international collaborations. The principles of the Charter are basically not legally binding but they show the true path as adopted by the Universal Declaration of Human Rights [12].

VIII. 3. THE RIO DECLARATION AND ITS ROLE IN PROTECTING NATURAL ENVIRONMENT

On December 22nd, 1989, the General Assembly decided to hold the United Nations Conference on Environmental and Development under Resolution 44/228 in Brazil in 1992. Important issues were discussed at that conference including protection the atmosphere, control of air pollution, protection the diversity of the species, proper disposal of waste, improvement of life quality, human's health, protection of the oceans, protection of the forests, and financial issues of fight against environmental pollution. On June 14th, the conference ended by adopting three non-binding texts: the United Nations Conference on Environmental and Development, the

Declaration on the Principles of the Forests, and the Action Plan for the 21st Century. Moreover, two other conventions were passed at that conference: the Convention of the Diversity of Biological Species and the Convention of Climate Change. A total of five documents were adopted: types of pollution, international actions for compensation for damages caused by water pollution, air pollution, estimation of environmental damages, the convention of civil liability of damages caused by space objects [12].

IX. CONCLUSION

In the present study, new and sustainable approaches and methods in protecting natural environment were explained. Therefore, it was concluded that by focusing on idealistic approaches, i.e. diminishing realistic trend and resorting to critical modernistic approaches and International Environmental Law are thought to be among methods that guarantee the new approach of environment protection. An important issue in investigating mechanisms of protecting natural environment is that nowadays the International Environmental Law is referred to as one of the essential and important branches in the International Law and global issues and as was mentioned before, it cannot be separated from critical discussions. Therefore, establishing a communication between the two fields of security and protection of natural environment is a requisite for maintenance of peace in the world. On the other hand, a more important issue is that environmental problems are international or global and controlling them requires international political attempts. Since the 1970s, a lot of agreements have been signed and various international organizations have been established in order to supervise them and protect the natural environment. Most international political attempts to protect natural environment were based on regulation and implementation of these principles that are influenced and regulated by a lot of processes and factors. Due to the importance of environmental concerns in continuation of natural life of governments and nations, it is vivid that diminishing of realistic paradigm in the present structure of the international system and resorting to liberalism lessons like institutionalism in the international organizations and environmental conventions of the UN will guarantee the health and protection of natural environment. In addition, establishing social and political democracy in countries, creating responsive and democratic political structure can help protect natural environment. Nowadays, all of these components of protecting mechanisms of environment should include political, economic, cultural, and social aspects and analyzed in terms of sustainable development. In other words, in the present circumstances development will be attained while protecting human rights and dignity, providing health environmental conditions, and respecting values, first we should feel that there is a globe, then we all live in the same land despite of superficial political, legal, and geographical divisions, and finally the principle of values, rules, and authoritative responsibility of

the International Law and security creating duties should be institutionalized.

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